

# Night Terrors in Children: Prevalence and Influencing Factors

Michael Schredl, Ph.D.

Night terrors are defined as sudden arousals from slow wave sleep accompanied with intense fear. They must be distinguished from nightmares, posttraumatic reenactments and nocturnal panic attacks. The present study investigated the relationship between night terror frequency and sleep and waking-life behavior in children aged 6 to 11. The prevalence rate of night terrors was 18 % and 4 % of the children experience night terrors once or more a week. The results indicate that parasomnias such as nightmares, night terrors and sleepwalking often occur together. In contrast to nightmare frequency, no substantial correlation between personality and night terror frequency emerged. As expected, the occurrence of stressors (hospitalization, school problems, parental divorce and amount of TV consumption) was associated with night terrors. However, the pattern was gender specific. Longitudinal studies should be carried out in order to investigate whether stress is also responsible for intra-individual fluctuations. Such investigations may prove fruitful for developing and evaluating effective treatment strategies for night terrors in children. (*Sleep and Hypnosis* 2001;3(2):68-72)

*Key words:* night terror, parasomnia, children, stress

## INTRODUCTION

Night terrors are defined as sudden arousals from slow wave sleep accompanied by intense fear. They tend to occur most often in the first part of the night. Typically, the night terror attack begins with a scream, the person sits up in bed and sleepwalking may follow (ICSD; 1). There is a marked increase in heart rate and breathing frequency (2), but the person is not oriented, i.e., not completely awakened by the attack. Very often the incident is not remembered in the morning. Single sentences or mental images, e.g., "A dog is biting me." or "Let me go" can be present during the attack (3). Night terrors have to be distinguished from nightmares (detailed recall, second half of the night), posttraumatic reenactments (detailed recall, content reflects a previous

trauma) and nocturnal panic attacks (comparable to panic attacks experienced during the day).

Exact prevalence rates of the disorder exist to a limited extend. Hublin et al. (4) pointed out that questionnaire surveys can be strongly biased since the phenomenology of night terrors is not a common knowledge and the diagnostic criteria (first part of the night, amnesia etc.) must thus be presented explicitly to explain the term night terror to ensure adequate estimates. Several authors (4,5) estimate that up to 40% of children have experienced at least one night terror attack during childhood. Cross-sectional data yielded prevalence rates (occurrence at least once a year) ranging from 3.5% (6) to 6.2% (7). Kurth, Göhler and Knaape (3) estimated the peak prevalence between five and seven years of age. Gender differences (preponderance of boys) were often not found (3).

Interestingly, night terrors co-occur often with other parasomnias such as sleep walking (see above) and nightmares (8,9). Polysomnographic studies (10,11) revealed that the sleep of children with night terrors is disturbed (micro arousals, frequent sleep stage shifts), also in nights without night terror

---

From the Sleep laboratory, Central Institute of Mental Health, Mannheim, Germany

Address reprint requests to: Dr. Michael Schredl, Schlaflabor, Zentralinstitut für Seelische Gesundheit, Postfach 122120, 68072 Mannheim  
Fax: ++49-621-23429 e-mail: Schredl@as200.zi-mannheim.de

Accepted February 12, 2001

attack. For adults, findings indicate that night terror patients tend to rate their sleep quality to be poorer than healthy controls (12).

Many authors (13) view night terrors as a maturation problem since the prevalence rate decreases rapidly with age. This viewpoint, however, has not answered questions about etiology. Surveys detecting familiar aggregation (14,15) and a twin study (16) suggest that a genetic disposition is of importance. Almost all adult patients reported that stress causes an increase in night terror frequency (14). In 40% of a children sample, parents indicated that exciting day-time experiences (over-exertion, school problems, TV consumption) may contribute to the occurrence of a night terror attack (3). The effect of state factors is more clearly seen if children experience a trauma; 50% of the children who were kidnapped with their school bus experienced night terrors after the trauma (17). Similarly, in children with severe burns after an accident, night terrors also often occur (18).

Agrell and Axelsson (19) reported on 23 children suffering from night terrors who have also enlarged adenoids. After removing the adenoids, night terror attacks ceased almost completely. Since enlarged adenoids are a major cause of obstructive sleep apnea in children (cf. 20), the drops in blood oxygen saturation as consequence of the apneas may cause night terrors.

To summarize, the etiology of night terrors seems to be best explained by a combination of predisposition and stress factors. Many questions, however, remain open. The present study investigated the prevalence rate of night terrors in an unselected sample of school-aged children and the effect of stressors and trait factors on night terror frequency.

## METHOD

### Parental Questionnaire

For the purpose of the study, a questionnaire for parents was developed. First, the age of the parents, the child's age (year and month) and sex, and the nationality of the child was elicited. In addition, the following six items refer to the child's sleep behavior. First, the parents were asked about the child's sleep duration during the week and at weekends. Four six-point scales (0=none, 1=less than once a week, 2=about once a month, 3=two or three times a month, 4=about once a week, 5=several times a week) were constructed to measure nightmare fre-

quency, the frequency of nocturnal awakening, night terrors and sleepwalking. A detailed explanation (occurrence in the first part of the night, child's amnesia) was given for night terrors. Additionally, the frequency of day-time napping was elicited (0=none, 1=once or twice a week, 2=several times a week).

In a separate section, different aspects of the child's waking life were measured. First, the parents were asked to rate their child's personality along seven five-point scales. The extreme points of these scales were characterized by the following adjectives: earnest (1) – imaginative (5), ambitious (1) – lazy (5), sociable (1) – reserved (5), taciturn (1) – communicative (5), active (1) – quiet (5), very curious (1) – not curious (5), capricious (1) – balanced (5). Similarly, school problems were measured by a five-point scale (1=child is doing well at school to 5=child has school problems). Next, the daily TV consumption was elicited. Further items measured current and past day-time stressors such as hospitalizations, chronic illnesses, death of a close person, accidents (e.g., car accident, accident with severe wounding), natural disasters (e.g., flooding, lightning), parental divorce and not-specified others. A cumulative stressor index (coded as 1 and 0) was computed for these items excluding hospitalizations and chronic illnesses.

### Procedure

In two schools ("Grundschule") in the city of Mannheim, questionnaires, instruction sheets and envelopes were handed out to all children in the classroom by one of the experimenters. The instruction sheet informed them about the goal of the study and emphasized the voluntariness of the participation. After completing the questionnaire by one of the parents, the children brought back the questionnaire (within the sealed envelope) to their school teacher.

The questionnaire data were coded and analyzed with the SAS for Windows 6.10 statistical software package. To analyze gender differences, analyses of covariance with the covariate age were computed. Similarly, age was partialled out in the correlations between nightmare frequency and other variables. Ranks were analyzed when the scale's measurement level was ordinal (e.g., nightmare frequency). Logistic regressions were applied for nominal scales. The power of the statistical test is  $p=.9701$  ( $N=300$ ,  $\alpha=0.05$ , small effect size:  $r=0.2$ , one-tailed).

## Participants

Overall, 431 questionnaires were handed out to the children (first to fourth grade). The 310 questionnaires were returned. Of these ten questionnaires were not completed, i.e., the parents actively refused to participate in the study. The data of 300 children were included in the analyses; the response rate is 69.6%. The mean age of the total sample was  $8.83 \pm 1.04$  years (range: 6.42 to 11.5 years). The mean age of boys ( $N=148$ ) and girls ( $N=152$ ) did not differ significantly ( $8.85 \pm 1.06$  [boys] vs.  $8.80 \pm 1.03$  [girls],  $t=0.4$ ,  $p=.7032$ ). The mean ages of the mothers and fathers were  $36.2 \pm 5.0$  years and  $39.6 \pm 6.1$  years, respectively. 236 children were Germans, the rest were comprised of a variety of nationalities including Turkey, former Yugoslavia, Italy and Poland.

## RESULTS

Night terrors were less often reported than nightmares, but more often than sleepwalking (cf. Table 1). Overall, for 18.0% of the children at least one night terror attack was indicated; boys and girls did not differ in this respect (19.1% [girls] vs. 16.9% [boys],  $\chi^2=0.2$ ,  $p=.622$ ). 3.7% of the sample experience night terrors at least once a week and, again, no gender difference was found (4.6% [girls] vs. 2.7% [boys],  $\chi^2=0.8$ ,  $p=.381$ ).

The coefficients presented in Table 2 show that night terrors were related to nightmares and sleepwalking. Similarly, the frequency of nocturnal awakenings correlated with night terror frequency. A negative relationship was found for sleep duration during the week, especially for girls.

Regarding the estimates concerning the several personality dimensions, no substantial coefficient emerged. The pattern of the effects of stressors was gender specific: whereas the hospitalization stressor and stressors in general were related to night terror frequency in girls, the amount of TV consumption and school problems correlated with night terror frequency in boys. For both sexes, parental divorce was associated with a higher prevalence of night terrors.

**Table 1. Sleep behavior (Means  $\pm$  SD)**

Variable	Mean $\pm$ SD
Frequency of nocturnal awakening	1.65 $\pm$ 1.80
Nightmare frequency	0.76 $\pm$ 1.18
Frequency of night terrors	0.37 $\pm$ 0.99
Frequency of sleepwalking	0.13 $\pm$ 0.60

## DISCUSSION

In the present sample, night terrors were reported for 18.0% of the children; this figure is lower than the estimate of Rabenschlag (5) but higher than the rate of 6.2% reported by Vela-Bueno et al. (7). In view of the response rate of 69.6%, the prevalence rate should be interpreted with caution but may be regarded as a close estimate since it seems reasonable to assume that the occurrence of sleep difficulties is not strongly associated with responding. The percentage of children with frequent night terrors (4.0%) was comparable to the data reported in the literature (3). Although the questionnaire item used in the present study including a description of the major features of night terrors (first half of the night, amnesia) in order to avoid over-estimation (4), it will be interesting to conduct polysomnographic studies or diary studies with these children to validate the questionnaire data.

Confirming previous findings, the intercorrelations between different kinds of parasomnias (night terror, sleepwalking, nightmares) were strong and, thus, supported the hypothesis that there is a common underlying vulnerability to parasomnia or sleep disorders in general (21). The more frequent nocturnal awakenings and the shortened sleep duration found in girls may indicate that sleep is disturbed in children with night terrors (see introduction).

In contrast to nightmare frequency which correlated with personality traits linked to the concept of thin boundaries (22) in this sample (24), the frequency of night terrors was not related to any personality dimension. Despite the strong correlation between nightmare frequency and frequency of night terrors, this finding can be interpreted as different predisposition to these parasomnias since Hartmann (22) views thin boundaries as an important etiological factor in nightmares. The findings of Fisher and Rinehart (21) indicate that the vulnerability to stress and inadequate coping strategies, on the other hand, may be the common factor in predisposition to parasomnias. This hypothesis was supported by the present data since stress was related to nightmare frequency (23) as well as frequency of night terrors. Parental divorce, hospitalizations, school problems and the amount of TV consumption were associated with more frequent night terrors. To answer the question whether these factors are also important for explaining intraindividual fluctuation, it will be necessary to carry out longitudinal studies eliciting waking-life stressors and the occurrence of night terrors daily (diaries kept by the

**Table 2. Correlations between night terror frequency and sleep variables, personality dimensions and waking-life stressors**

Variable	Total sample	Boys	Girls
Sleep duration (during the week)	-.115 *	-.009	-.239 **
Sleep duration (weekends)	-.080	-.034	-.121
Frequency of nocturnal awakening	.235 ***	.289 ***	.202 **
Nightmare frequency	.423 ***	.468 ***	.390 ***
Frequency of sleepwalking	.188 **	.185 *	.192 *
Frequency of day-time napping	-.047	-.106	.019
Earnest (1) – Imaginative (5)	.002	.049	-.036
Ambitious (1) – Lazy (5)	.081	.033	.120
Sociable (1) – Reserved (5)	.007	-.084	.079
Taciturn (1) – Communicative (5)	.036	.149	-.063
Active (1) – Quiet (5)	-.026	-.105	.039
Very curious (1) – Not curious (5)	-.007	-.074	.051
Capricious (1) – Balanced (5)	-.006	.077	-.082
School problems (1 to 5)	.090	.158 *	.038
TV consumption (hours per day)	.119 *	.146 *	.096
Hospitalization	.124 *	.004	.241 **
Chronic illness	-.047	-.114	-.003
Cumulative index of stressors	.088	-.001	.170 *
Accident	.002	-.107	.092
Death of a close person	-.047	-.077	-.021
Parental divorce	.148 **	.164 *	.138 *
Spearman-Rank-Correlations with age partialled out			

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$  (one-tailed tests for stress measures)

parents). The finding of gender specific patterns in the relationship between various stressors and night terror frequency are difficult to interpret, but it seems worthwhile to focus on this issue in the future because of the possible clinical implication (different treatment strategies for boys and girls).

Although night terrors occur less often than nightmares, patients with night terrors, or better: their parents, consult a pediatric sleep disorder center more often than those suffering from nightmares (24). The 13.0% of the patients were diagnosed as having night terrors whereas only 0.3 % of the children suffered from nightmares (24). This may be explained by the more dramatic physiological arousal pattern of night terrors (scream, very intense fear), the confusion after the attack as well as the difficul-

ty in awakening the child. The high percentage of parents seeking help for night terrors underlines the importance for performing an adequate diagnosis and to develop and evaluate efficient treatment strategies.

Up till now, a few cases of the beneficial effects of hypnosis were reported in the literature (25,26). The present findings indicate that stress reduction using relaxation techniques such as autogenic training may be a promising treatment strategy for night terrors in children.

To summarize, night terrors do occur to a considerable amount in school-aged children and the development and evaluation of efficient treatment strategies will be an important task for future research in this area.

## REFERENCES

- Schramm E, Riemann D. *Internationale Klassifikation der Schlafstörungen (ICSD)*. Weinheim: Beltz, 1995.
- Fisher C, Kahn E, Edwards A, Davis DM. A psychophysiological study of nightmares and night terrors: The suppression of stage 4 night terrors with diazepam. *Archives of General Psychiatry* 1973;28:252-259.
- Kurth E, Göhler I, Knaape HH. *Untersuchungen über den Pavor nocturnus bei Kindern*. *Psychiatrie, Neurologie und Medizinische Psychologie* 1965;17:1-7.
- Hublin C, Kaprio J, Partinen M, Koskenvuo M. Limits of self-report in assessing sleep terrors in a population survey. *Sleep* 1999;22:89-93.

5. Rabenschlag U. Parasomnien im Kindesalter—Epidemiologie und klinische Relevanz. *Wiener Klinische Wochenschrift* 2000;112:S3-S5.
6. Klackenberg G. Incidence of parasomnias in children in a general population. In: Guilleminault C, ed. *Sleep and its Disorders in Children*. New York: Raven Press, 1987.
7. Vela-Bueno A, Bixler EO, Dobladez-Blanco B, Rubio ME, Mattison RE, Kales A. Prevalence of night terrors and nightmares in elementary school children: A pilot study. *Research Communications in Psychology, Psychiatry and Behavior* 1985;10:177-188.
8. Fisher BE, McGuire K. Do diagnostic patterns exist in the sleep behaviors of normal children. *Journal of Abnormal Child Psychology* 1990;18:179-186.
9. Hawkins C, Williams TI. Nightmares, life events and behavior problems in preschool children. *Child: Care, Health and Development* 1992;18:117-128.
10. Benoit O, Goldenberg-Leygonie F, Lacombe J, Marc MF. Sommeil de l'enfant des manifestations episodique du sommeil: Comparision avec l'enfant normal. *Electroencephalography and Clinical Neurophysiology* 1978;44:502-512.
11. Guilleminault C. Disorders of arousal in children: Somnambulism and night terrors. In: Guilleminault C, ed. *Sleep and its Disorders in Children*. New York: Raven Press, 1987.
12. Schredl M. *Träume und Schlafstörungen: Empirische Studie zur Traumerinnerungshäufigkeit und zum Trauminhalt schlafgestörter PatientInnen*. Marburg: Tectum, 1998.
13. Keith PR. Night terrors: A review of the psychology, neurophysiology and therapy. *Journal of the American Academy of Child Psychiatry* 1975;14:477-484.
14. Kales JD, Kales A, Soldatos CR, Caldwell AB, Charney DS, Martin ED. Night terrors: Clinical characteristics and personality patterns. *Archives of General Psychiatry* 1980;37:1413-1417.
15. Oda N, Sunada J, Hatta H, Abe K, Umegaki Y. Tics, night crying, sleep-walking and night terrors: A potential common etiological basis. *Japanese Journal of Child and Adolescent Psychiatry* 1978;19:149-159.
16. Bakwin H. Sleep-walking in twins. *Lancet* 1970;2:446-447.
17. Terr LC. Chowchilla revisited: The effects of psychic trauma four years after a schoolbus kidnapping. *American Journal of Psychiatry* 1983;140:1543-1550.
18. Stoddard FJ, Chedekal DS, Shakun L. Dreams and nightmares of burned children. In: Barrett D, ed. *Trauma and Dreams*. Cambridge: Harvard University Press, 1996.
19. Agrell IG, Axelsson A. The relationship between pavor nocturnus and adenoids. *Acta Paedopsychiatrica* 1972;39:46-53.
20. Paditz E, Gräther M, Koch R, Erler T, Hoch B, Schäfer T, Stute H, Wiater A. Häufigkeit von OSAS-Symptomen in Kleinkindesalter. *Somnologie* 1999;3:313-318.
21. Fisher BE, Rinehart S. Stress, arousal, psychopathology and temperament: A multidimensional approach to sleep disturbances in children. *Personality and Individual Differences* 1990;11:431-438.
22. Hartmann E. *Boundaries in the Mind*. New York: Basic Books, 1991.
23. Schredl M, Blomeyer D, Görlinger M. Nightmares in children: influencing factors. *Somnologie* 2000;4:145-149.
24. Ferber R, Boyle MP. Six year experience of a pediatric sleep disorders center. *Sleep Research* 1986;15:120.
25. Taboada EL. Night terrors in a child treated with hypnosis. *American Journal of Clinical Hypnosis* 1975;17:270-271.
26. Gardner GG, Olness K. *Hypnosis and Hypnotherapy with Children*. New York: Grune & Stratton, 1981.