

Original article

The clinical presentation of childhood partial arousal parasomnias

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Abstract

Objectives: The goal of the current study was to compare the sleep characteristics of children diagnosed with a partial arousal parasomnia to a community sample and further, to compare children diagnosed with sleep terrors to those diagnosed with sleepwalking.

Background: Many children experience frightened awakenings, with up to 15% meeting criteria for a parasomnia. Despite this, very little empirical data exists examining parasomnias in childhood.

Method: The parents of children (between 2 and 12 years of age) referred to a pediatric sleep disorders clinic completed the Children's Sleep Habits Questionnaire (CSH) on their child. The group meeting criteria for partial parasomnia was then matched with a community sample to identify differences in sleep characteristics between children with parasomnias and a normative sample.

Results: Children with parasomnias had higher rates of bedtime resistance, sleep onset delay, night waking, and reduced sleep duration than a matched community sample. Sleepwalkers had more sleep onset problems than children with sleep terrors. Almost one quarter of sleepwalkers between 3 and 12 years of age reported nocturnal enuresis.

Conclusions: Children with partial arousal parasomnias do have slightly more disturbed sleep than community controls. © 2000 Elsevier Science B.V. All rights reserved.

Keywords: Children; Parasomnias; Sleep terrors; Sleepwalking; Children's Sleep Habits Questionnaire

1. Introduction

Sleep terrors and sleepwalking have been described as similar disorders of arousal [1], characterized clinically by a lack of responsiveness to the environment, automatic actions and lack of memory for the nocturnal event. The disorders differ in that sleep terrors are often accompanied by a sudden awakening where the child appears in significant distress with a high degree

of physiological arousal and often screams, while sleepwalkers typically will get out of bed with no apparent distress and walk around. The child may appear awake with their eyes open in either case, but is unresponsive to parent attempts to console or wake the child.

Community surveys suggest that up to 45% all children experience frightened awakenings, with approximately 3.5% of this group fitting criteria for sleep terrors [2]. Up to 40% of children experience at least one episode of sleepwalking, with 15% experiencing multiple episodes [3]. However, when recurrent sleepwalking or sleep terrors are examined, the incidence rates in a normative population drop to 1–

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3% of all children [1]. Thus, while a few incidents of sleepwalking or sleep terrors appear part of normal development, recurrent difficulties may prompt families to seek outside assistance.

Beyond case descriptions [4], very little empirical data has been presented on children with parasomnias. Only one study [5] has examined the overlap between sleepwalking and sleep terrors, but the sample consisted of adults. Given the paucity of empirical data with children, the purpose of the current study was threefold. First, to present descriptive data on the clinical presentation of children who were referred to a pediatric sleep disorders clinic and subsequently diagnosed with either sleepwalking or sleep terrors. Second, the sleep and behavioral characteristics of children with parasomnias were compared with a community sample, the hypothesis being that children with parasomnias would overall have more disturbed sleep than children in the community sample. Third, the sleep characteristics of children presenting with sleepwalking vs. sleep terrors were compared. It was hypothesized that there would be no differences between the two groups based on current conceptualizations of the two parasomnias.

2. Method

2.1. Participants

Participants included all children who were referred to a pediatric sleep disorders subspecialty clinic during a 4-year period. The Pediatric Sleep Disorders Clinic is based in a tertiary care Children's Hospital and consists of a multidisciplinary team of pediatricians and psychologists. Children are generally referred to this clinic by their primary care physician or consulting subspecialist (e.g. neurologist). Out of approximately 500 referrals in this time period, there were a total of 49 children who were diagnosed following an evaluation in the sleep clinic with either sleepwalking (SW) or sleep terrors (ST). Eleven children were excluded because they had more than one sleep related diagnosis, four with both ST or SW; five with limit setting sleep disorder (four in the ST and one in the SW group), and two had nightmares as a second diagnosis. The final sample consisted of 16 children with SW and 22 children with ST. The dura-

tion of sleep disturbance ranged from 3 weeks to approximately 6 years (Mean (M) = 18.5 months). There was no difference between the two groups on duration of disturbance, $t(36) = 1.64$, ns; (sleepwalking, M = 20.7, SD = 18.0 months; sleep terrors, M = 12.1, SD = 11.7 months). The frequency of the sleep-related disturbances ranged from everyday to twice per month, with a mean of approximately four episodes per week.

The participants in this study represented a broad range of socio-economic classes: 22.9% of the families reported income levels less than \$15 000 per year; 11.4% were between \$15 000 to \$25 000; 37.1% were between the \$25 000 and \$50 000 range; and 28.6% reported incomes greater than \$50 000 per year. The study sample was primarily Caucasian ($n = 31$; 82%) with seven children (18%) of Hispanic origin.

The 16 children in the SW group, eight boys and eight girls, ranged from 4.5 years to 12.2 years of age (M = 8.2, SD = 2.3 years). The 22 children in the ST group, 15 boys and seven girls, ranged in age from 2.2 years to 11.5 years (M = 6.3 years, SD = 2.6 years). The two groups did not differ by gender, $\chi^2(1, n = 38) = 1.28$, ns or SES (collapsed into low vs. high SES), $\chi^2(1, n = 38) = 0.45$, ns. The two groups did differ on age, $t(36) = 2.39$, $P < 0.05$, the SW group being older than the ST group. Consequently, the analyses comparing the two groups covaried age.

2.2. Comparison group

A local community sample of 484 children who had completed the Children's Sleep Habits Questionnaire [6] as part of a survey of children's sleep habits was available for comparison with the clinical sample [7]. The age range in the community sample was 4.8 years to 11 years old. Consequently, 11 children in the parasomnia group that did not fall in this age range were excluded when the community and clinical samples were compared. Based on gender, age, and socio-economic status, we selected one child from the community sample to serve as a matched control for each of the remaining 27 children with parasomnias.

2.3. Procedure

Parents were asked to complete a packet of sleep and behavior questionnaires, routinely used as part of

the clinical evaluation, before their child's appointment. These included a standardized developmental history questionnaire, The Eyberg Child Behavior Inventory [6], and the Children's Sleep Habits Questionnaire [7]. During the Pediatric Sleep Disorders Clinic appointment, all children received an extensive diagnostic evaluation including review of questionnaires, interviews with a pediatrician and psychologist, and physical exam. After the evaluation, diagnoses were reached by multidisciplinary team consensus using the International Classification of Sleep Disorders Diagnostic and Coding Manual Criteria: sleep walking (ambulation that occurs in sleep; difficulty in arousing the patient during an episode and amnesia following an episode), and sleep terrors (sudden episodes of intense terror during sleep; occurs within the first third of the night; partial or total amnesia for the events during the episode).

2.4. Measure

Children's Sleep Habits Questionnaire (CSHQ), is a 52-item instrument that assesses a number of aspects of childhood sleep [7]. The following conceptually derived subscales have been reported: bedtime resistance, sleep onset delay, sleep duration, sleep anxiety, night wakings, parasomnias, sleep disordered breathing, and daytime sleepiness [8]. This parent report measure is rated on a 3-point scale ranging from 'rarely' to 'usually'. This measure also includes an open-ended question that asks parents to record their child's usual amount of sleep per day including both sleep during the night and daytime naps. The majority of one-week test-retest reliability coefficients were >0.60 [9].

3. Results

The percentage endorsement for each sleep item is displayed in Table 1 separately for children with parasomnias who were matched with the community sample ($n = 27$) and the matched community sample ($n = 27$). The means and standard deviations for each subscale are also listed, for the matched samples. A series of paired t -tests were used to compare the matched groups on the subscale scores. Statistical significance was set at $P < 0.006$ using the Bonferroni correction ($0.05/8 = 0.006$), with trends reported

if $P < 0.05$. As seen in Table 1, the two groups were significantly different on 5 out of 8 subscales of the CSHQ: bedtime resistance, sleep onset delay, sleep duration, night-wakings and parasomnias (including enuresis). The groups did not differ on sleep anxiety, sleep disordered breathing, or daytime sleepiness. Wilcoxon signed ranks tests were also run as a non-parametric test to examine differences between these groups. All findings of significance matched the results presented in the table from paired t -tests.

Within the total parasomnias sample, analyses of variance covarying age were used to compare the sleepwalkers and children with sleep terrors on each of the subscale scores. The only significant difference was found on the sleep onset delay item, $F(2,35) = 15.05$, $P < 0.001$; there was a trend on the night wakings subscale $F(2,35) = 5.18$, $P < 0.05$. The sleep walkers had longer sleep onset delay ($M = 1.8$, $SD = 0.7$) than the children with sleep terrors ($M = 1.1$, $SD = 0.3$). The children with sleep terrors ($M = 6.2$, $SD = 1.3$) also had somewhat more night wakings than the sleepwalkers ($M = 5.1$, $SD = 1.5$).

4. Discussion

In comparison with a matched community sample, children with parasomnias had significantly higher rates of bedtime resistance, sleep onset delay, night wakings, and reduced sleep duration. The most striking difference was evident regarding difficulty falling asleep within 20 min. Whereas only 42% of the children with parasomnias 'sometimes' or 'usually' fell asleep within 20 min, the entire community sample did so. Similar rates have been found as well in other community samples (11%, [10]). Parents of the children with parasomnias also believed their children did not sleep enough. Despite evidence of more disturbed sleep, there was no difference in self-report of daytime sleepiness, which is consistent with the clinical impression that parasomnias do not have a major impact on the day's functioning.

In regard to other parasomnias experienced, with the exception of bruxism, more than half of the parents of the clinical sample reported other parasomnias compared with much lower rates in the community sample. Bruxism was reported by about 40% of the parents of the children with parasomnias and 23%

Table 1
Distribution of scores on the items of the CSHQ for a sample of children with parasomnias matched on age and gender to a community sample ($n = 27$)^a

Subscale item	Matched parasomnia sample ($n = 27$)				Matched community sample ($n = 27$)				t	P		
	Rarely %	Sometimes %	Usually %	M	SD	Rarely %	Sometimes %	Usually %			M	SD
1. Bedtime resistance				8.1 ^b	3.1				10.7 ^b	1.6	3.98	< 0.001
2. Goes to bed at same time	85.2	11.1	3.7			11.1	7.4	81.5				
4. Falls asleep in own bed	85.2	3.7	11.1			11.1	7.4	81.5				
5. Falls asleep in other's bed	77.8	7.4	14.8			63.0	25.9	11.1				
8. Needs parent in room to sleep	77.8	11.1	11.1			74.1	22.2	3.7				
11. Struggles at bedtime	70.4	22.2	7.4			85.2	7.4	7.4				
13. Afraid of sleeping alone	66.7	11.1	22.2			81.5	11.1	7.4				
2. Sleep onset delay				1.4 ^b	0.6				2.9 ^b	0.3	11.0	< 0.001
3. Falls asleep in 20 min	63.0	29.6	7.4			0	7.4	92.6				
3. Sleep duration				3.9 ^b	1.5				7.0 ^b	0.7	8.69	< 0.001
15. Sleeps too little	70.4	18.5	11.1			74.1	25.9	0				
17. Sleeps the right amount	77.8	14.8	7.4			3.7	7.4	88.9				
18. Sleeps same amount each day	88.9	3.7	7.4			7.4	0	92.6				
4. Sleep anxiety				6.3 ^c	2.4				5.3 ^c	1.8	1.73	ns
8. Needs parent in room to sleep	77.8	11.1	11.1			74.1	22.2	3.7				
12. Afraid of sleeping in the dark	44.4	14.8	40.7			66.7	18.5	14.8				
13. Afraid of sleeping alone	66.7	11.1	22.2			81.5	11.1	7.4				
29. Trouble sleeping away	74.1	11.1	14.8			80.8	15.4	3.8				
5. Night wakings				5.5 ^c	1.3				3.6 ^c	0.9	5.49	< 0.001
23. Moves to other's bed in night	51.9	33.3	14.8			84.0	16.0	0				
33. Awakes once during night	22.2	40.7	37.0			61.5	30.8	7.7				
34. Awakes more than once	48.1	40.7	11.1			96.2	3.8	0				
6. Parasomnias				12.6 ^c	3.0				8.0 ^c	1.1	6.90	< 0.001
19. Wets the bed at night	88.9	3.7	7.4			84.6	7.7	7.7				
20. Talks during sleep	40.7	22.2	37.0			84.6	15.4	0				
21. Restless and moves a lot	18.5	37.0	44.4			73.1	26.9	0				
22. Sleepwalks	48.1	25.9	25.9			96.2	3.8	0				
25. Grinds teeth during sleep	59.3	22.2	18.5			76.9	23.1	0				

Table 1 (continued)

Subscale item	Matched parasomnia sample (n = 27)				Matched community sample (n = 27)				t	P
	Rarely %	Sometimes %	Usually %	M	SD	Rarely %	Sometimes %	Usually %		
31. Awakens screaming, sweating	44.4	25.9	29.6			100	0	0		
32. Alarmed by scary dream	40.7	37.0	22.2			92.3	7.7	0		
7. Sleep disordered breathing				3.4 ^c	1.1				3.6 ^c	0.8
26. Snores loudly	74.1	22.2	3.7			70.4	25.9	3.7		
27. Stops breathing	88.9	11.1	0			100	0	0		
28. Snorts and gasps	85.7	14.3	0			92.6	7.4	0		
8. Daytime sleepiness				10.6 ^c	3.1				10.6 ^c	2.2
38. Wakes by himself	33.3	48.1	18.5			29.6	25.9	44.4		
40. Wakes up in negative mood	48.1	40.7	11.1			66.7	29.6	3.7		
41. Others wake child	29.6	44.4	25.9			22.2	55.6	22.2		
42. Hard time getting out of bed	59.3	29.6	11.1			59.3	33.3	7.4		
43. Takes long time to be alert	74.1	22.2	3.7			76.0	20.0	4.0		
48. Seems tired	59.3	37.0	3.7			66.7	33.3	0		
50. Watching TV	74.1	14.8	11.1			74.1	18.5	7.4		
51. Riding in car	63.0	25.9	11.1			63.0	22.0	14.8		

^a Percentages may not add up to 100 due to rounding; n's vary slightly due to some missing data.

^b Lower mean score indicates more disturbance.

^c Higher mean score indicates more disturbance.

of the parents in the community sample. About 10% of these children reported bedwetting, which is somewhat higher than norms reported in the literature [10,11], but comparable with our community sample. Interestingly, all of the children reporting bedwetting had a primary diagnosis of sleepwalking, and were between ages 9–12. Although these findings are speculative given the small number of subjects, the results support prior research demonstrating a relationship between bedwetting and SW [2], and indicates a much higher incidence of bedwetting than would be found in the normal population, i.e. 25% of the SW sample.

Another purpose of this paper was to examine whether there were differences in general sleep characteristics of sleepwalkers vs. children with sleep terrors. The hypothesis that there would be no differences between the groups was supported for overall sleep disturbance and daytime sleepiness. However, the two groups were significantly different on sleep onset delay and night wakings. Specifically, a smaller percentage of children with sleepwalking fell asleep within 20 min than children with sleep terrors (13 vs. 83% ‘sometimes or usually’ fell asleep within 20 min), but there were significantly more night wakings in the children with sleep terrors than the sleepwalkers. The children with sleep terrors almost twice as often moved to another person’s bed during the night. This may be a function of the parents bringing the child into their bed secondary to the sleep terror. Whatever the reason, it appears that children with sleep terrors have more disrupted sleep than children with sleepwalking.

The current study does have the limitation of using a treatment seeking sample. Thus, it is possible that these findings do not generalize to children seen at a pediatrician’s office whose parents don’t request a tertiary care referral. Future research might examine children presenting with similar concerns in a primary care setting. Since we eliminated any subjects who had more than one sleep diagnosis, it’s not clear whether the findings extend to children with combined SW and ST, or with other co-existing

common sleep disturbances. In addition the diagnosis of sleepwalking vs. sleep terrors was not polysomnographically confirmed since PSG is not necessary in the management of such cases. Nonetheless, given the lack of data available on the sleep characteristics of clinical samples of children with parasomnias, the information presented in this report may be helpful to clinicians in evaluating the overall sleep disturbance in children they are evaluating for parasomnias.

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