

POLYSOMNOGRAPHY, A NEW MODALITY IN EVALUATING SLEEP DISORDERS IN CHILDREN

N. El Nady, M. Shalabi and A. Sherif

Pediatric Department, Benha Faculty of Medicine

ABSTRACT

Relatively, little is known about sleep disturbances among children, this descriptive study, examined a variety of common sleep behaviors in a group of 500 elementary school children aged from 4 to 10 years (median 7 years), using a battery of sleep questionnaires. The prevalence of parent-defined sleep problems ranged from head banging (3.2%) to teeth grinding (19.2%) and bed wetting (21.2%) with 94 children (18.8%) of over all sample described as having significant sleep problems. Polysomnographic recordings were obtained from 21 children with severe sleep disturbances : rhythmic movement disorders (4 children), obstructive sleep apnea syndrome (OSAS) 5 children, nocturnal enuresis (5 children) and other parasomnias constitute 7 children. One of the four children with rhythmic movement disorders proved by polysomnographic records (EEG) to had nocturnal frontal lobe epilepsy, while 3 children out of the five children with clinically suspected OSAS met its polysomnographic criteria . We concluded from this study that sleep disturbances are common in school aged children and polysomnography is of great value in diagnosis of OSAS and violent nocturnal movements.

Introduction

Sleep disorders in children are frequent and usually harmless. Awareness of these disorders is an essential part of modern medicine (Vgontzas & Kales, 1999). Parasomnias are more frequent in children than adults and from the most common parasomnias are sleep talk, sleep walk, nightmares and teeth grinding (Owens, et al, 2000). Sleep disorders occur more frequently in children who have OSAS due to rel-

ative sleep deprivation as well as apneic episodes which act as " Trigger " for sleep disorders (Marcus and Loughlin, 1996). To clarify and diagnose sleep disorders in children we need sleep diary, careful examination and possibly using diagnostic equipments such as video- polysomnography (Wiggs and Store, 1995) . The aim of this study is to detect the prevalence of sleep disorders among preschool and school children, also, to evaluate the role of polysomnographic study in the diagnosis of

sleep disorders.

Material and Methods

Five hundred healthy children aged from 4-10 (median 7 years) were selected randomly from nurseries and primary schools in Benha and Cairo districts, males were 230 children, while females were 270 children. All children were subjected to thorough clinical examination to exclude any condition that may affect the sleep profile such as asthma, infection, Attention Deficit Hyperactivity Disorder (ADHD) or neurological illness. Parents received a carefully designed questionnaire covering up most, if not all, the aspects of sleep disorders. From the ninety four positive cases, a careful selection of 21 cases only to be subjected to nocturnal videopolysomnographic examination in Cairo Center for Sleep Disorders which included : respiratory monitoring, oxymetry, eye movement monitoring, body movement monitoring, ElectroEncephaloGraphy (EEG), ElectroCardioGraphy (ECG), ElectroMyeloGraphy (EMG) as well as, other parameters. Children were chosen according to the clinical guidelines by the Board of Directors of the American Sleep Disorders Association (ASDA, 1997). The diagnostic categories that are considered included the following : sleep related breathing disorders (5 children), neuromuscular disorders (4 children), violent or unusual parasomnias (7 children) and

five cases with nocturnal enuresis.

The results :

The prevalence of sleep disorders among selected healthy children as collected from questionnaire data was 18.8% (94 cases) divided into 59 females and 35 males. Table (1) shows the distribution of sleep disorders among the 94 cases and it seems clearly that bed wetting (21.28%), teeth grinding (19.15%), loud snoring (12.76%), sleep talk (10.63%) and disturbed bedding (9.57%) were the most common types.

The results of polysomnographic examination were as follows :

- Of the four children with rhythmic movement disorders (head banging-body rocking) only one child had a major episode (sudden elevation of the head and trunk from the bed with complex behavior) occurring in Non-Rapid Eye Movement (NREM) sleep with a positive epileptic form abnormalities of the EEG, representing a particular form of nocturnal frontal lobe epilepsy rather than parasomnia. He received antiepileptic medications for his condition with dramatic improvement.

- Of the five children with clinically suspected OSAS only 3 children met its polysomnographic criteria (Gohdy, et al, 2000) . All of them had adenoidal and tonsillar hy-

Polysomnography, A New Modality

ptrophy. These patients underwent adenotonsillectomy and then had a follow up polysomnography with marked improvement of their respiratory symptoms (snoring, difficult breathing and frequent awakening) as shown in (figure 1).

- As regards the polysomnographic recordings, which were obtained from the five children with severe persistent nocturnal enuresis, the mean latency sleep onset and first bladder voiding was 3hrs. 40-min. \pm 23 min. and the enuretic

events were predominantly a non-REM sleep phenomenon.

- In the seven children with different parasomnias, coexisting sleep disturbances were frequent with difficult falling asleep, night walk and nightmares. The character of movements, level of responsiveness and electrophysiologic stage of sleep were detected during each spell. But arousal parasomnias (night terrors, sleep walking and confusional arousal) were not detected in this study.

Table (1) : Distribution of sleep disorders in the studied cases by questionnaire

Sleep disorders	Male	Female	Total N = 94	%
Bed wetting	14	6	20	21.28%
Teeth grinding	6	12	18	19.15%
Loud snoring	5	7	12	12.76%
Sleep talk	4	6	10	10.63%
Disturbed bedding	2	7	9	9.57%
Sleep walk	2	4	6	6.38%
Diff. establish. sleep	3	3	6	6.38%
Frequent night awak.	2	3	5	5.32%
Nightmare	2	3	5	5.32%
Head banging	2	1	3	3.19%
Total (%)	35 (37.2%)	59 (62.8%)	94	100%

DISCUSSION

Sleep disorders is an essential part of modern medicine due to its profound effect on individual people and on society as well (Vgontzas and Kales, 1999). The prevalence of sleep disorders among healthy children in our study was (18.8%) which is similar to results of Paavonen et al (2000), who reported the prevalence to be 21% and in his study difficulty in establishing sleep (bed time resistance) was the most prevalent type, while in our study bed wetting and teeth grinding were the most prevalent, respectively. In another study by Laberge et al (2000) somniloquy, leg restlessness and sleep bruxism were the most frequent parasomnias. More girls were effected with leg restlessness, while, enuresis and somniloquy were more common in boys. A similar observation was noticed in our study, where out of 20 enuretic children, 14 (70%) were males and 6 (30%) were females. In a study by Smedje et al (1999), The most common sleep problems were; night walking (15.5%), snoring (7.7%), difficulty in falling asleep (5.6%), bed wetting (5.3%) and nightmares (3.1%). Different results were reported by Owens et al (2000) who studied sleep problems in elementary school children. A 37% of his studied sample reported having significant sleep problems ranging from sleep disorder breathing (3.7%) to bed time resistance (15%). From the above mentioned

data we can notice that sleep disturbances is common among school children but it differs in its prevalence and types according to the studied communities.

Obstructive sleep apnea syndrome (OSAS) is a common cause of morbidity during childhood, it usually stems from adenotonsillar hypertrophy and symptoms include; snoring and difficult breathing during sleep (Ward and Marcus, 1996). In an attempt to determine the presence or absence of true sleep apnea syndrome, in our study, Nocturnal polysomnography was used and 3 patient (66%) out of 5 children predicted clinically to have OSAS, had positive polysomnographic criteria. A similar result was reported by Goldstein et al (1994) who found 10 of his 18 patients (55.6%) to have OSAS. Clinically our 3 patients were found to have marked adenotonsillar hypertrophy and were referred for adenotonsillectomy. A follow up polysomnography after surgery, demonstrated a reduction in the number of obstructive events, less sever oxygen desaturation, and reduction of snoring episodes.

Four of our patients were complaining of rhythmic movement disorders (head banging, body rocking and leg banging). In all subjects, these events were strongly associated with stage two NREM sleep and K-complexes. Only one patient had a major episode with positive epileptic form abnormalities of the

EEG. He was diagnosed as nocturnal frontal lobe epilepsy and received antiepileptic drugs to which he was greatly improved.

In our polysomnographic study, it was evident that coexisting sleep disorders were frequent in children with difficulties falling asleep, night walking and nightmares. But bed wetting usually emerged as a singular sleep disturbance.

In conclusion, although, sleep disturbances are common among preschool and school children, parents seldom express a need to seek professional help or remedy. Polysomnography is a useful tool in diagnosis of OSAS in clinically suspected cases. Also the diagnosis of violent nocturnal movements can be greatly enhanced, by documenting the suspected nocturnal behavior with video-polysomnography.

Finally, the traditional history taking schedules in pediatrics, needs to be supplemented with questions about sleep to avoid such disorder being overlooked, inadequately defined or confused with each other.

REFERENCES

1. American Sleep Disorders Association (ASDA), standards of Practice committee; (1997) : Practice parameters for the indications for polysomnography and related procedures; *Sleep*; 20 (6) : 406-22.
2. Gohdy D Y; Caster P; Marcus CL; (2000) : Sleep architecture and respiratory disturbances in children with obstructive sleep apnea, *Am J Resp Crit care Med.*; 162 : 682-686.
3. Goldstein NA; Sculerate N; Walsleben et al (1994) : Clinical diagnosis of pediatric obstructive sleep apnea validated by polysomnography. *Otolaryngol Head Neck Surg*; 111 (5) : 611 : 7.
4. Laberge L; Trembry RF; Vitarra F; et al (2000) : Development of parasomnias from childhood to early adolescence; *Pediatrics*; 106 : 67-74.
5. Marcus CI; Loughlin GM (1996) : Obstructive sleep apnea in children; *Semin Pediatr Neurol*; 3 (1) : 23-8.
6. Owens JA; Spirito A; Mc Guinn M et al (2000) : Sleep habits and sleep disturbances in elementary school aged children, *J Dev Behav Pediatr*; 21 (1) : 27-36.
7. Paavonen EJ; Aronen ET; Moilanen I; et al (2000): Sleep problems of school aged children; *Acta Pediatr*; 89 (2) : 223-8.
8. Smedje H; Broman JE; Helta J (1999) : Parent reports of disturbed sleep in 5-7 years old swedish children. *Acta Pediatr*; 88 (6) : 858-65.
9. Vgontzas AN and Kales A

Polysomnography, A New Modality

(1999) : Sleep and its disorders; Neurophysiol; 13 (3) : 198 - 207.
Annu Rev Med; 50 : 387-400.

10. Ward A. and Marcus B
(1996) : Obstructive sleep apnea in
infants & young children; J Clin

11. Wiggs L; Store C (1995) :
Children sleep, How should it be as-
sessed? A.C.P.R. News; 1 (7) : 153-
157.