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## **Sleep problems in primary school children: comparison between mainstream and special school children**

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### **Summary**

This paper reports on a study of the prevalence and social correlates of dys-somnias, features associated with obstructive sleep apnoea, and parasomnias in primary school children aged 4–12. Head teachers of schools selected randomly from lists of local primary and special schools were contacted by telephone and asked to distribute a questionnaire package to the parents of all pupils aged 4–12 years. In all, 890 parents of children from mainstream schools and 300 from special schools were approached. The response rates were 64.7% and 60%, respectively. The results showed that significantly higher proportions of children in special schools than in mainstream schools presented four of the five dyssomnias investigated and all of the features associated with obstructive sleep apnoea. In contrast, only two of the seven parasomnias were presented by higher proportions of the children in special schools. Age and gender differences for the two groups of children are presented. Finally, multiple correlations were computed between a range of child, family, and environmental characteristics and the three problems most frequently reported: frequency of settling problems; sleeping in the parents' bed; and night waking. The findings are discussed with reference to other studies of children's sleep problems, and the implications for treatment are considered.

**Keywords:** sleep, learning disability, mainstream schools, children, maternal stress, responsiveness

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## Introduction

Sleep problems are frequently found in young children. Among the most common are reluctance to settle to sleep at bedtime and night waking problems. Some children are very difficult to settle, refusing to go to bed or go to sleep on their own. Some come downstairs repeatedly after bedtime. Some children settle easily but wake several times during the night, disturbing their parents by crying or calling for attention or by creeping into their parents' bed. Other common sleep problems include nightmares, sleep terrors, sleep talking, sleep walking, bedwetting, tooth grinding, and head banging (Horne 1992; Mindell 1993). Frequently problems are short lived and have no long lasting effects. However, some can become persistent and have significant effects on family functioning (Stores 1996). Night-time difficulties can seriously disrupt family life, leading to fatigue, irritability, limitation of parents' social activities, and marital discord (Jones & Verduyn 1983). Night waking is sometimes a trigger for child abuse (Bax 1980; Chavin & Tinson 1980). Stress and depression, which are common in mothers of young children, can be made worse by sleep deprivation. Tired parents are unable to think up rational ways of coping with their child's sleep problems and often resort to shouting, smacking, and punishment. Not surprisingly, mothers of children with sleep problems have been found to be more stressed than other mothers, report more irritability with their children, and smack them more frequently Quine 1992a, b, 1993). For school-aged children sleep problems may interfere with many aspects of their lives (Stores 1996). Children who are tired during the day may have difficulty concentrating in school and may have behavioural problems in the classroom. At home they may be difficult to manage, throw temper tantrums, or quarrel with siblings (Minde *et al.* 1994). These are good reasons why sleep problems should be taken seriously.

The frequency of reported sleep problems is high. Studies have estimated that 15–20% of 1–2-year-olds (Richman 1981; Scott & Richards 1990) and 16–18% of 3-year-olds (Richman *et al.* 1975; Zuckerman *et al.* 1987) have settling problems. Night waking problems are common too, with 20–26% of 1–2-year-olds (Richman 1981; Scott & Richards 1990) and 14–22% of 3-year-olds (Jenkins *et al.* 1980; Richman *et al.* 1975; Zuckerman *et al.* 1987) waking regularly during the night. In the Isle of Wight study, Rutter *et al.* (1970) found that even at 10–12 years of age up to 20% of children have problems of this nature. Fifty to 70 per cent of children with problems at age 1 will continue to have them at age 2 (Jenkins *et al.* 1984). Sleep problems that persist at age 3 often become chronic, with two-thirds of problem sleepers at this time being described as problem

sleepers 5 years later (Richman *et al.* 1982). In a national cohort study of 5-year-olds Pollock (1994) found that children with sleeping problems at 5 years of age were likely still to have such problems at 10 years of age.

Children with intellectual disabilities seem to be particularly likely to present sleep disturbance (Bartlett *et al.* 1985; Quine 1991; Stores 1996). Quine (1991), for example, found that 84% of 0–5-year-olds and 63% of 6–10-year-olds presented night waking problems. Night settling problems were also common, with 62% of 0–5-year-olds and 49% of 6–10-year-olds presenting problems. In a comparison between four groups of children, Stores *et al.* (1996) found that children with Down's Syndrome and children with other forms of intellectual disability were more likely to present problems of settling, waking, and co-sleeping than siblings and children from the general population.

Until fairly recently, parents, clinicians, and researchers have paid relatively little attention to sleep disorders in children. Parents rarely ask for help until the problem has become chronic and the whole family is suffering. Clinicians have tended to fall back on the use of medication as the only way of relieving problems, although research on efficacy has been equivocal (Chavin & Tinson 1980; Richman 1985; Simonoff & Stores 1987). Though sleep problems and ways of treating them have begun to attract more research attention (Mindell 1993; Edwards & Christopherson 1994; Kerr & Jowett 1994; Minde *et al.* 1994; Atkinson *et al.* 1995), there have been few population studies that have examined the prevalence of a range of sleep problems in older children. A questionnaire compiled by Simonds and Parraga (1982), which focuses on symptoms of dyssomnias and parasomnias that have been identified in children and can be clinically observed, facilitates such studies.

In the International Classification of Sleep Disorders (American Sleep Disorders Association 1990), which is the most comprehensive classification available, sleep disturbances are classified into two major categories: the dyssomnias, which include disorders of initiating or maintaining sleep or of excessive sleepiness, and the parasomnias, which are disorders that disrupt sleep after it has been initiated. The dyssomnias are of three kinds: those that originate from causes within the body (e.g. obstructive sleep apnoea); those that originate from causes outside the body and are often influenced by parental responses to the child at bedtime (e.g. limit setting sleep disorder, sleep onset association disorder); and circadian rhythm disorders (e.g. irregular sleep-wake pattern), which are related to the timing of sleep within the 24-h day (American Sleep Disorders Association 1990). Some of the latter are influenced by the timing of the sleep period, which is under parental control, whereas others are disorders of neurological mechanisms and are sometimes

found in children with severe brain damage (Okawa & Sasaki 1987). Table 1 describes the main sleep disorders in the dyssomnias group that are found in school-aged children and the symptoms associated with them.

The parasomnias are undesirable physical phenomena that occur during sleep and interrupt it. These disorders are manifestations of central nervous system activity usually transmitted through skeletal muscle or autonomic nervous system channels. There are four groups: problems of arousal (e.g. sleepwalking, sleep terrors); sleep–wake transition disorders (e.g. headbanging, sleep talking); problems that occur predominantly during REM sleep (e.g. nightmares); and ‘other parasomnias’, those not classified in the other sections (e.g. tooth grinding and bedwetting) (American Sleep Disorders Association 1990). Table 2 describes the sleep disorders in the parasomnias group that are found in school-aged children and shows the main symptoms associated with them. The parasomnias occur quite frequently in otherwise healthy children. Symptoms may range from a single episode to nightly events that continue for a long period of time. As the child grows older symptoms usually disappear completely. The cause of parasomnias is unknown, although they are thought to be associated with immaturity of the central nervous system.

### **Aims of the study**

The aims of the investigation were threefold:

- 1 To determine the prevalence of a wide range of sleep problems and sleep behaviours in a sample of children from 4 to 12 years of age selected from mainstream schools and special schools and to compare prevalence rates for the two groups.
- 2 To examine age and gender differences in sleep problems for children in mainstream and special schools.
- 3 To examine the correlates of the three most common problems: night settling problems, night waking, and sleeping in the parents’ bed.

### **Method**

#### **Sample**

The study was carried out at the beginning of the school year. Head teachers of schools selected randomly from lists of local primary and special schools

**Table 1** Dyssomnias in children: description and symptoms

Disorder	Description and symptoms
Internal	
Obstructive Sleep Apnoea Syndrome	Loud rasping snoring that occurs every night and can be heard outside the bedroom; difficulty breathing during sleep; restless sleep; repeated episodes of breathing difficulty followed by partial waking with restless movements, briefly improved breathing with loud snorting or gasping followed by return to sleep. Symptoms may include bedwetting, daytime sleepiness, irritability, and problems with concentration. Children may have enlarged tonsils or adenoids and be overweight.
External	
Sleep Onset Association Disorder	The problem is associated with the absence of certain conditions, e.g. being held, rocked or breast fed, having the parent in the bedroom while falling asleep, or being allowed to fall asleep in the parents' room or downstairs. The child wakes up and the conditions he associates with falling asleep are not present. Settling is not a problem provided that the associations required for falling asleep are present. Symptoms are prolonged and frequent night waking.
Limit Setting Sleep Disorder	Parents have been unable to set limits for the child's behaviour, which results in difficulty settling at bedtime, reluctance to go to bed, sleepiness during the day. Once the child has gone to sleep, sleep is usually normal.
Nocturnal Fears	The child is afraid to go to bed or wakes complaining of robbers, monsters or frightening dreams. The child appears fearful and anxious. Settling problems; night waking; anxiety.
Adjustment Sleep Disorder	This sleep disturbance is related to a period of acute stress, anxiety, or environmental change. It may start when the child's security is suddenly threatened, for example by the arrival of a new baby, the death of a grandparent, or the first day at school. Settling problems; early waking; anxiety and sleepiness during the day; bodily symptoms such as aches, pains, or headaches; child appears irritable or miserable.
Circadian rhythm disorders	
Irregular Sleep-Wake Pattern	Irregular pattern of at least three sleep periods during the 24 h day; difficulty falling asleep and staying asleep at night; total sleep time is normal but sleep occurs at wrong time; sleepiness during the daytime and frequent daytime sleeps.
Delayed Sleep Phase Syndrome	Inability to fall sleep within 2 h of the desired sleep time or to wake up spontaneously at the desired time of waking; although sleep time is normal it occurs at the wrong time in the 24 h day. Symptoms include reluctance to go to bed, settling problems, reluctance to get up, daytime sleepiness.
Advanced Sleep Phase Syndrome	Inability to stay awake until the desired bedtime; child's sleep time has shifted to an earlier time in the 24 h day. Symptoms include extreme sleepiness before bedtime and early morning waking (often before 5am).

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**Table 2** Parasomnias in children: description and symptoms

Disorder	Symptoms and Description
Problems of arousal Sleepwalking	Child sits up in bed or walks in sleep, generally during first half of the sleep period; child is difficult to wake and will not remember episode when he wakes.
Confusional Arousals	Sudden arousal from sleep, generally in the first half of the sleep period. The child may moan or mumble unintelligibly or thrash about in bed; child may appear confused or disorientated; child may appear awake but does not respond; attempts to wake child make matters worse. Episodes are sudden and can be startling.
Sleep Terrors	Child wakes in first third of the sleep period with a piercing scream. The child's eyes are open and dilated, his heart is beating wildly and he appears to be in a state of intense fear. The child will resist all attempts to comfort or reassure him and these may make things worse. He may get out of bed and run round the room, colliding with furniture. If woken he will be confused and disorientated. He will not remember the event the following day. Episodes last a few minutes and subside naturally.
Problems of sleep-wake transition Sleep Starts	Sudden brief muscular contractions of legs, arms, or head when falling asleep. Child may cry out or mutter.
Rhythmic Movement Disorder	Rhythmic body movements—headbanging, body rocking, or body rolling—which occur during drowsiness or light sleep. Symptoms usually start during the first two years of life.
Sleep Talking	Talking or making sounds during sleep without being aware of it.
Parasomnias associated with REM sleep Nightmares	Long, frightening dreams that wake the child and leave her feeling anxious and afraid. Usually occurs in the last half of the sleep period. The child will be able to remember the dream.
Other parasomnias Sleep Bruxism	The child's teeth make a loud grinding noise during sleep without the child being aware of it; sometimes there is muscle or face pain or headache. Episodes occur in bouts of 5–15 s and may be repeated many times during the night.
Sleep Enuresis	Bedwetting after the age of 5, at least one episode per month.

were contacted by telephone and asked to distribute a questionnaire package to the parents of all pupils aged 4–12 years. Each package consisted of a covering letter, a questionnaire, and a prepaid envelope for returning the questionnaire. Twelve out of 14 schools approached agreed to take part. The reason for non-participation was the same for both schools and was based solely on the volume of information being sent home to parents and a desire not to overwhelm them. After reminders, an overall response rate of 63.6% was achieved: 576 out of 890 from primary schools (64.7%) and 182 out of 300 from special schools (60.0%).

### **The questionnaire**

The questionnaire consisted of three sections. Section 1 contained questions about the child—age, gender, and general health—and about the family—maternal stress measured by the Malaise Inventory (Rutter *et al.* 1970), family composition, family size and parents' educational level and employment status. Section 2 was concerned with maternal responsiveness to sleep problems, measured by a scale developed by Quine and Wade (1991). In Section 3 parents were asked to rate whether their child had experienced a range of sleep problems using a scale adapted from work by Simonds and Parraga (1982, 1984). The scale describes in lay terms sleep problems found in children. Each item was rated by the frequency of the occurrence, from 0 'Never', to 1 'Less than once a month', 2 'About once a month', 3 'About once a week', 4 'Several times a week, or 5 'Every night'. The sleep problems have been grouped into three categories: dyssomnias or orders of initiating and maintaining sleep, parasomnias, and features associated with obstructive sleep apnoea.

## **Results**

### **Characteristics of the sample**

Table 3 shows the characteristics of the two groups of children according to age, gender, family size, family composition, child's health status, presence of enlarged tonsils/adenoids, presence of a medical condition requiring night attention (positioning difficulties, muscle spasm, skin irritation, asthma, etc.), parents' educational level, and parents' employment status.

There were no significant differences between groups by age, gender, family size, or family composition. However, there were significant differences on all

**Table 3** Characteristics of the sample

	Mainstream schools		Special schools		Chi-square
	%	(n)	%	(n)	
Age					
4–5	29	(167)	25	(46)	2.2 NS
6–8	45	(261)	44	(79)	
9–12	26	(147)	31	(56)	
Gender					
Boys	52	(299)	60	(108)	3.3 NS
Girls	48	(277)	40	(73)	
Family size					
1 child	12	(66)	15	(27)	1.4 NS
2 or 3	74	(421)	71	(128)	
4 or more	14	(81)	14	(25)	
Family composition					
Two parents	82	(468)	78	(138)	2.0 NS
Single parent	18	(101)	22	(40)	
Child's health					
Good	85	(489)	58	(104)	65.7†
Fair	14	(78)	35	(65)	
Poor	1	(7)	7	(12)	
Enlarged tonsils/adenoids					
Yes	19	(107)	31	(57)	13.2†
No	81	(469)	67	(125)	
Needs night attention					
Yes	4	(21)	20	(36)	51.7†
No	96	(555)	80	(146)	
Mother's educational level					
Qualifications	79	(415)	60	(160)	23.2†
No qualifications	21	(113)	40	(67)	
Father's educational level					
Qualifications	67	(371)	52	(94)	12.0†
No qualifications	33	(184)	48	(85)	
Mother's employment status					
Employed	52	(298)	30	(34)	27.1†
Not employed	48	(278)	70	(128)	
Father's employment status					
Employed	81	(466)	71	(130)	7.4*
Not employed	19	(110)	29	(52)	

\* $P < 0.01$ ; † $P < 0.001$ ; NS = not significant.

the variables relating to child health. Parents of children from special schools were more likely to report that their child had poor general health, had enlarged tonsils or adenoids, and had a medical condition requiring night-time attention. There were also significant differences between groups according to both

mother's and father's educational level and both mother's and father's employment status. Parents of children from special schools were educated to a lower level and were less likely to be employed.

### Prevalence

Table 4 shows the proportion of children in each group who presented sleep problems several times a week for three categories of sleep disorders: dyssomnias (or problems of initiating and maintaining sleep), features associated with obstructive sleep apnoea (OSA), and parasomnias. Significant differences were found between groups in all three categories. The results show that a significantly higher proportion of children in special schools presented four of the five dyssomnias in comparison with children in mainstream schools. Table 4 also shows that a significantly higher proportion of children in special

**Table 4** Percentage of children presenting sleep problems and behaviours several times a week

Sleep problem/behaviour	Mainstream schools (n = 576)		Special schools (n = 182)		Chi-square
	%	(n)	%	(n)	
<b>Dyssomnias</b>					
Settling problems	27	(127)	41	(74)	12.1†
Night waking problems	13	(76)	45	(82)	85.1†
Sleeps in parents' bed	11	(62)	17	(31)	5.0*
Night-time fears	2	(12)	2	(3)	0.1 NS
Early waking (before 5 am)	5	(26)	14	(24)	43.8†
<b>Features associated with obstructive sleep apnoea</b>					
Restlessness	26	(151)	53	(96)	44.3†
Loud snoring	14	(83)	27	(49)	15.1†
Apnoeic episodes	1	(6)	3	(6)	4.5*
Gags/chokes during sleep	1	(6)	3	(6)	4.5*
Daytime sleepiness	3	(17)	13	(24)	28.3†
<b>Parasomnias</b>					
Sleep talking	13	(75)	12	(21)	0.3 NS
Sleep walking	1	(4)	1	(2)	0.3 NS
Tooth grinding	10	(57)	14	(25)	2.1 NS
Headbanging	2	(10)	4	(8)	4.2*
Bedwetting	5	(28)	33	(60)	106.5†
Nightmares	4	(21)	6	(11)	2.0 NS
Sleep terrors	1	(3)	1	(1)	0.0 NS

\*  $P < 0.05$ ; † $P < 0.001$ ; NS = not significant.

schools were reported to present all of the features of OSA and two of the parasomnias.

### **Age differences in sleep problems**

Age differences in sleep problems were examined separately by Chi-squared test for children in mainstream and special schools. These are reported in Table 5.

#### *Children in mainstream schools*

For these children four dyssomnias were significantly related to age. All these problems reduced with age. Only one of the features associated with OSA, excessive daytime sleepiness, was related to age. Younger children were more likely to present this problem. Among the parasomnias, there were no associations with age for children in mainstream schools.

#### *Children in special schools*

For these children only two of the dyssomnias were associated with age. There were no age-related differences in sleep apnoea symptoms or among the parasomnias.

### **Gender differences in sleep problems**

#### *Children in mainstream schools*

Only one of the dyssomnias was related to gender. Boys were twice as likely as girls to wake before 5 am several times a week (6% (19) vs. 3% (seven); d.f. 1; Chi-square 4.9;  $P < 0.05$ ). Additionally, one of the symptoms associated with OSA, excessive daytime sleepiness, was also associated with gender. Five per cent (14) of boys but only 1% (three) of girls presented the problem (d.f. 1; Chi-square 6.5;  $P < 0.001$ ).

Among the parasomnias there were two gender differences for children in mainstream schools. Boys were more likely than girls to present both head-banging during the night (3% (nine) vs. 0% for girls; d.f. 1; Chi-square 5.9;  $P < 0.01$ ) and to wet the bed (7% (21) vs. 3% (seven); d.f. 1; Chi-square 6.3;  $P < 0.01$ ).

#### *Children in special schools*

For children in special schools there was only one difference by gender. Girls were nearly three times more likely to sleep in their parents' beds (16% (12) vs. 6% (12); d.f. 1; Chi-square 5.8;  $P < 0.01$ ).

**Table 5** Percentage of children presenting sleep problems and behaviours several times a week by age (*n*)

Sleep problem/behaviour	Mainstream Schools				Special Schools			
	4–5 ( <i>n</i> = 167)	6–8 ( <i>n</i> = 261)	9–12 ( <i>n</i> = 147)	Chi-square	4–5 ( <i>n</i> = 46)	6–8 ( <i>n</i> = 79)	9–12 ( <i>n</i> = 56)	Chi-square
Dyssomias								
Settling problems	37 (62)	22 (58)	25 (37)	11.8†	51 (23)	35 (28)	41 (23)	2.9 NS
Night waking problems	28 (46)	8 (21)	6 (9)	42.4‡	67 (31)	38 (30)	38 (21)	12.1†
Sleeps in parents' bed	17 (29)	8 (22)	0 (0)	29.3‡	22 (10)	9 (7)	2 (1)	11.4†
Night-time fears	1 (2)	3 (7)	2 (3)	1.1 NS	2 (1)	1 (1)	2 (1)	0.2 NS
Early waking (before 5 am)	8 (14)	3 (9)	2 (3)	8.5‡	28 (13)	24 (19)	21 (12)	0.6 NS
Features associated with obstructive sleep apnoea								
Restlessness	28 (47)	24 (63)	28 (41)	1.1 NS	44 (20)	58 (46)	54 (30)	2.5 NS
Loud snoring	16 (27)	16 (41)	10 (15)	2.9 NS	30 (14)	32 (25)	15 (10)	3.5 NS
Apnoeic episodes	1 (1)	2 (4)	1 (1)	1.1 NS	4 (2)	3 (2)	4 (2)	0.3 NS
Gags/chokes during sleep	1 (2)	1 (2)	1 (2)	0.4 NS	4 (2)	4 (3)	2 (1)	0.6 NS
Daytime sleepiness	6 (10)	2 (4)	2 (3)	7.6*	13 (6)	17 (13)	9 (5)	1.6 NS
Parasomnias								
Sleep talking	12 (20)	12 (31)	16 (24)	1.8 NS	7 (3)	15 (12)	11 (6)	2.2 NS
Sleep walking	1 (1)	1 (2)	1 (1)	0.0 NS	2 (1)	1 (1)	0 (0)	1.1 NS
Tooth grinding	13 (22)	10 (26)	6 (9)	4.3 NS	13 (6)	14 (11)	14 (8)	0.0 NS
Headbanging	1 (2)	2 (6)	1 (2)	0.9 NS	7 (3)	6 (5)	0 (0)	3.7 NS
Bedwetting	6 (10)	5 (14)	3 (4)	2.0 NS	39 (18)	37 (29)	23 (13)	3.6 NS
Nightmares	3 (5)	4 (11)	3 (5)	0.5 NS	11 (5)	3 (2)	7 (4)	3.7 NS
Sleep terrors	0 (0)	0 (0)	1 (2)	2.9 NS	2 (1)	0 (0)	0 (0)	2.9 NS

\* $P < 0.05$ ; † $P < 0.01$ ; ‡ $P < 0.001$ ; NS = not significant.

### **Correlates of dyssomnias in mainstream and special school children**

For our final analyses, we selected the three most common dyssomnias for both groups—night settling problems, night waking problems, and sleeping in the parents' bed—and used multiple regression analysis to compute their multiple correlations (beta weights) with child, family and environmental characteristics. This enabled us to examine the effects of each independent variable after controlling for each of the other variables. An advantage of multiple regression is that it can be used with categorical variables through the technique of dummy coding. Some of the independent variables—age, family size, maternal stress, and maternal responsiveness—were continuous variables. All other variables were dichotomised and coded 0 or 1 (for example, father's employment was dichotomised as unemployed (0) or employed (1)). The analyses were carried out separately for mainstream and special school children.

#### *Mainstream children*

For these children, three variables were significantly associated with settling problems when all other variables had been controlled for. These were, in order of importance, maternal stress (0.22), child's health status (−0.17), and age (−0.15) ( $R^2$  (13, 443) = 18.5;  $F$  = 7.7;  $P$  < 0.001). The numbers in brackets are the beta weights. For waking problems there were five significant variables. These were maternal stress (0.41), age (−0.21), presence of problems requiring night attention (0.20), mother's educational level (−0.19), and child's health status (−0.17) ( $R^2$  (13, 443) = 20.5;  $F$  = 8.8;  $P$  < 0.001). For sleeping in the parents' bed there were four significant variables: age (−0.32), maternal responsiveness (0.19), family size (−0.19), and maternal stress (0.10) ( $R^2$  (13, 443) = 22.0;  $F$  = 9.6;  $P$  < 0.001).

#### *Special school children*

For these children, only two variables were significantly associated with settling problems when the effects of all other variables had been controlled. These were maternal stress (0.24) and maternal responsiveness (0.14) ( $R^2$  (13, 130) = 20.0;  $F$  = 2.5;  $P$  < 0.01). Three variables were associated with waking problems: maternal stress (0.27), presence of problems requiring night attention (0.21), and maternal responsiveness (0.17) ( $R^2$  (13, 130) = 30.8;  $F$  = 4.4;  $P$  < 0.001). For sleeping in the parents' bed, maternal responsiveness (0.42) was the only significant variable ( $R^2$  (13, 130) = 25.7;  $F$  = 3.5;  $P$  < 0.001).

## Discussion

This study has provided evidence about the prevalence of a wide range of sleep problems in school-aged children and compared prevalence rates for children attending mainstream schools with those attending special schools for children with intellectual disabilities. The two groups of children were no different in terms of their age, gender, family size, or family composition. However, children from special schools were more likely to suffer poor health, to have enlarged tonsils or adenoids, and to have a medical condition requiring attention at night (some children had difficulty getting comfortable at night due to cerebral palsy, some had respiratory difficulties, etc.). This was not unexpected, since many children with learning disabilities have additional physical impairments that might affect sleep. There were also significant differences between groups according to mother's and father's employment status. These results are consistent with a number of studies showing the effects of having a disabled child on the parents' economic activity (Glendinning 1983; Baldwin 1985). Finally, there were significant differences between groups in their parents' educational level. It is generally accepted that more cases of mild intellectual impairment are found in lower socio-economic groups (Fryers 1984). The case for severe intellectual impairment is more equivocal, with some studies demonstrating and colleagues failing to demonstrate a social class bias in cases (Kushlick & Blunden 1974; Cooper & Lakus 1984).

## Prevalence of sleep problems

There were significant differences between mainstream and special school children for the five dyssomnias investigated, with significantly greater numbers of children from special schools presenting each problem. The three most frequently reported sleep problems in the dyssomnias category for both mainstream and special school children were the same, though the frequency with which they were reported varied. The prevalence rates for dyssomnias found in children with intellectual disabilities in this study were similar to those found by Wiggs (1996), who also used an adaptation of the Simmonds and Parraga measure. Evidence from other studies also suggests a greater prevalence of problems among children with learning disabilities (Bartlett *et al.* 1985; Clements *et al.* 1986; Stores *et al.* 1996). There are many possible reasons. Children with learning disabilities learn at a much slower rate than their non-handicapped peers and they often have limited use and understanding of language. They may find it more difficult to learn the 'rules' of appropriate

night-time behaviour. Physical impairments may add to the difficulty by reducing the opportunities for learning. They may also increase the likelihood that a child will have a sleep problem. Children with physical impairments often find it difficult to get comfortable at night. They may find it hard to change position, or they may experience discomfort due to muscle spasm. They may be made uncomfortable by incontinence, skin irritations, or breathing difficulties. Children with additional sensory impairments may not receive cues that bedtime is approaching: the child who is blind does not see darkness fall, for example. Many children with learning disabilities also suffer from epilepsy, which may disrupt a child's sleeping patterns. Additionally, parents of children with learning disabilities are often more responsive to them when bedtime problems occur (Quine 1991, 1992b). Anxiety about the child may sometimes lead a parent to change their normal patterns of child-rearing, which may unintentionally encourage sleep problems. The parents of a child who has been seriously ill as a baby, or who has a condition such as cerebral palsy, may go to him at night if there is the slightest noise, and this may make the child slow to learn that night-time is for sleeping.

The study also found differences between groups in reports of features associated with OSA, with significantly greater numbers of children from special schools presenting each problem. This is consistent with a growing literature that suggests that sleep apnoea is found more frequently in children with learning disabilities, particularly those with Down's syndrome (Silverman 1988; Stebbens *et al.* 1991; Stores *et al.* 1996). In this study, children with learning disabilities were found to be more likely to have enlarged tonsils or adenoids, one of the possible causal factors for sleep apnoea in children (Ferber 1986).

In contrast to the dyssomnias and features of sleep apnoea, only two of the seven parasomnias were presented more frequently by children in special schools. These were headbanging and bedwetting. It is well known that children with learning disabilities present with headbanging more frequently than non-handicapped children, and it is thought to be a form of pleasurable stimulation that has become a learned habit (Horne 1992). Similarly, children with learning disabilities are slow to learn bladder control and a significant proportion never achieve it (Ferber 1986).

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### **Relationships with age**

In mainstream children, four of the five dyssomnias and one of the features characterizing sleep apnoea significantly decreased with age. None of the other features associated with sleep apnoea were age-related, which is to be expected

since the causal factors are thought to be physiological (Guilleminault *et al.* 1981) and removal of the affected child's tonsils and/or adenoids is reported to cure 70% of children (Stradling *et al.* 1990). None of the parasomnias were related to age, and this is consistent with the view that they are generally due to developmental factors and spontaneously remit in the early years (Horne 1992). In older children, continued experience of parasomnias such as partial waking with agitated episodes, sleepwalking, and sleep terrors are of greater clinical significance and may be related to emotional factors (Ferber 1986).

For children in special schools only two of the dyssomnias—sleeping in the parents' bed and waking at night—were age-related, suggesting that children with learning disabilities are less likely to outgrow these problems without intervention.

### **Correlates of sleep problems**

It is difficult to disentangle the cause and effect relationships between sleep problems and environmental factors. It is unlikely that any single variable is the 'cause' of a child's sleep problem. Nevertheless it is useful to examine the multiple correlations between the most common sleep problems and child, family, and environmental factors.

#### *Children in mainstream schools*

Our examination of the correlates of settling problems in mainstream school children showed that the strongest independent association with frequency of settling problems was maternal stress. Such a relationship has been confirmed by many researchers (Richman *et al.* 1982; Van Tassel 1985; Scott & Richards 1990; Quine 1991). As noted, there are problems of interpretation, as maternal stress may be a cause or an effect of a child's sleep disturbance. It is likely, for example, that having a child who sleeps badly, waking a large number of times during the night, may have serious effects on maternal stress levels by creating chronic sleep deprivation. However, it is also likely that stressed parents may inadvertently contribute to sleep problems, perhaps by changes in the quality of parental care (Cox 1988). Stressed parents may have less time for their children or show them less affection and more hostility, for example. Tired and stressed parents may find themselves unable to respond appropriately and consistently to their child when (s)he wakes in the night, whatever the causes of their stress, thus inadvertently maintaining sleep problems. Experimental interventions with sleepless children have shed some light on the

causal patterns. Researchers have shown that teaching parents to solve their children's sleep problems generally results in a reduction of maternal stress (Quine 1992a; Wolfson *et al.* 1992; Wiggs 1996). However, the issue is complex (Walters 1993).

A further independent correlation was between settling problems and poorer child health. This relationship has been reported before in the literature (Wender *et al.* 1976; Jenkins *et al.* 1984; Horne 1992). One explanation views childhood illness as an antecedent, which triggers settling problems in a child who has previously settled easily. It suggests that parents relax the usual rules of bedtime behaviour when a child is ill. They may allow the child to sleep in their bed, or stay with him until he falls asleep. Poor sleep habits often persist even when the illness has got better because the child enjoys the attention and fuss he has received and wants it to continue. He responds with tears and tantrums when parents try to restore the usual bedtime routine. A second explanation views illness as a maintaining factor, suggesting that parents of frequently sick children are generally more indulgent towards them than towards their more healthy offspring.

Age was the only other independent correlate of settling problems. As we noted in the Introduction, sleep problems in children at age 5 are more likely to become chronic (Pollock 1994).

The variable showing the strongest independent association with frequency of waking problems for children in mainstream schools was maternal stress. Also associated with waking frequency was mother's educational level, but this was correlated negatively with waking. We pointed earlier to the fact that children with sleep problems frequently come from families where educational levels are low and social stressors are high (Scott & Richards 1990; Walters 1993; Kerr & Jowett 1994). It is likely that these problems combine to produce an environment where sleep problems can flourish. Tired parents who are poorly educated and worn down by the effects of many social stressors may give the wrong kinds of attention to children and may be less able to offer firm, consistent bedtime limits (Ferber 1986). It is also possible that parents of lower educational level find it harder to understand the importance of teaching a child good sleep habits. The Newsons' famous study of children in Nottingham, for example, found that many working class parents reported indulging their child at bedtime and tackling problems in inconsistent ways with short-term ends in view (Newson & Newson 1963).

Two health variables also showed correlations with frequency of waking. These were the presence of a disability requiring night attention and the child's health status. Children who were frequently sick were more likely than other

children to present wake frequently. We have discussed the two explanations suggested in the literature. A final correlation with frequent waking for mainstream school children was the child's age. We have discussed this correlation in an earlier section.

Four variables were found to be independently related to sleeping in the parents' bed. Younger children, those with more responsive parents, those who were in smaller families, and those whose parents were more stressed were more likely to be allowed to share their parents' bed on a regular basis. Studies have found that sleep disturbance in children often coexists with family disarray and maternal stress (Bax 1980; Walters 1993; Kerr & Jowett 1994), but the causal links, as noted, may be complex. It is easy to see how a circular pattern may be set up where stressed parents give in to a child who wants to share their bed, only to encourage the formation of poor sleep habits which will persist for a long time.

#### *Children in special schools*

For children in special schools the only independent associations with settling problems were maternal stress and maternal responsiveness. The children of parents who were more likely to engage in certain patterns of behaviour when the child would not settle at night, such as allowing the child to stay up, giving cuddles and drinks, or staying in the room until the child fell asleep, were more likely to present settling problems, and stressed parents were more likely to be responsive. In an earlier longitudinal study (Quine 1991), we found that maternal responses influenced the severity of sleep problems. We suggested that parents of children with a learning disability are perhaps more likely to be indulgent towards their children, thus inadvertently encouraging sleep problems. After behavioural training, many parents were more able to ignore fussy behaviour at night (Quine 1993).

There were three correlates of waking problems. These were maternal stress, the presence of a disability requiring night attention, and maternal responsiveness. As we have noted, many children with severe learning disabilities have additional physical impairments (Quine & Pahl 1985, 1991). In addition, both maternal stress and maternal responsiveness have been found to be related to sleep problems in children with learning disabilities in other studies (Quine 1991, 1992b).

The only variable independently related to sleeping in the parents bed for children in special schools was maternal responsiveness, which has been discussed above.

## Conclusions

Sleep problems in very young children are known to be common and stressful to parents. Evidence from this study shows that significant numbers of children in both mainstream and special schools present these problems. There is good evidence that the use of behavioural approaches to teach parents how to manage sleep problems can bring fast and effective results (Milan *et al.* 1981; Graziano & Mooney 1982; Adams & Rickert 1989; Seymour *et al.* 1989; Durand & Mindell 1990; Piazza & Fisher 1991; Quine 1993, 1997; Kerr & Jowett 1994). Studies have found that successful treatment also improves the mother's emotional state, interaction with her child, and confidence in her parenting skills (Wolfson *et al.* 1992; Quine 1993). These are good reasons why sleep problems should be addressed.

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