

Disturbed sleep: effects of sociocultural factors and illness

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Abstract

To assess the prevalence of sleep disturbance and associated risk factors, sleep patterns were analysed in 14 372 English and Scottish children. Approximately 4% of children aged 5 experienced disturbed sleep more than once a week, but this decreased to 1% from age 9. Less than 25% of the parents with an affected child consulted a doctor. Sleep disturbance was associated with persistent wheezing compared to non-wheezing children (odds ratio 4.42; 95% confidence interval (CI) 3.17 to 6.13), and more frequent in children of Indian subcontinent descent than in white children (odds ratio 2.20; 95% CI 1.34 to 3.60), and in children whose mother reached no more than primary education compared with those with higher education (odds ratio 2.41; 95% CI 1.51 to 3.84). Sociocultural factors associated with ethnicity and respiratory illness are important risk factors for sleeping disorders in childhood.

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Sleep disturbance in schoolchildren has scarcely been studied. The only large published study was based on the 1970 British Births Survey.^{1 2} Most of the available reports on sleep disturbance have focused on preschool children, in whom the problem may be different in magnitude, nature, and aetiology.³⁻⁵ As with enuresis and other behavioural problems, childhood sleeplessness creates serious problems in the family. Sleep disturbance challenges the coping ability of parents by enhancing interpersonal conflicts, chronic fatigue, a feeling of desperation, and curtailment of social and family life.⁶ The possibility that disturbed sleep can trigger parental violence against the child has been recognised as a potential additional problem by several investigators.⁶

Previous studies have reported that the prevalence of sleep disturbance is between 14% and 29% in the age range 1 to 3 years.^{4 5 7} Twenty five per cent of parents of 5 year olds reported a sleep problem of some type, but only 1.4% of the total sample were regarded as having a severe problem.¹ The main problems reported by parents were related to difficulties in getting off to sleep, waking during the night, night terrors or nightmares, and waking early in the morning.

A wide range of possible causes of sleep disturbance have been reported. Most applied to

preschool children and their relevance for older children is uncertain, although Pollock reported a significant increased risk of sleep problems at 10 years if the child had the problem at age 5.¹ The same investigator showed that a large number of factors were significantly associated with disturbed sleep, but the majority had odds ratios near to 1. The significant associations in his study were with maternal age at child's birth, West Indian and African origin, method of delivery, writing problems, and previous attendance at child guidance services.

In an earlier study we examined sleep duration in 5 to 11 year olds.⁸ In this study we report on the prevalence and associated risk factors of disturbed sleep in the age range 5 to 11 in England and Scotland from data collected in 1991 and 1992. The study is based on parents' information about their child's behaviour.

Methods

The data were from three samples which make up the National Study of Health and Growth (NSHG), a health surveillance system carried out in primary schools in England and Scotland. The English and Scottish samples were obtained by stratified random sampling of areas, based on unemployment, uptake of free school meals, and children leaving school at 15 years in 1970. Proportionally more areas from poorer background strata were selected for the study. A third sample, an English "inner city sample," was selected by characteristics of deprivation and ethnic composition.⁹ The English stratified sample was surveyed in 1992, the Scottish sample was surveyed in 1991-92, and the English inner city sample in 1991. The stratified English and Scottish samples are referred to as representative samples because, despite the sampling strategy, their social characteristics were similar to other samples selected as representative of the country.¹⁰

In order to explore sleep disturbances, we used the questions concerning sleep quality developed by Clements and colleagues.¹¹ In a self administered questionnaire, parents were asked if their child had disturbed sleep at night, excluding periods of illness. The parents had to tick one of the alternatives that best described their child. The alternatives were: "sleep disturbed most nights—cries and needs attention"; "sleep disturbed once or twice a week—cries and needs attention"; "sleep disturbed occasionally—cries and needs attention"; "sleep disturbed—wants attention, but does not cry"; "sleeps poorly but lies quietly when awake"; and "usually sleeps well." We also

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Table 1 Prevalence of sleep problems by age and sex

Age (years)	Total No	No (%) with disturbed sleep		
		≥1 a week	<1 a week	No (%) with poor sleep
Boys				
5	1131	46 (4.1)	141 (12.5)	19 (1.7)
6	1169	25 (2.1)	89 (7.6)	16 (1.4)
7	1112	27 (2.4)	72 (6.5)	20 (1.8)
8	1081	15 (1.4)	63 (5.8)	12 (1.1)
9	1073	9 (0.8)	42 (3.9)	20 (1.9)
10	1095	7 (0.6)	29 (2.7)	22 (2.0)
11	676	6 (0.9)	21 (3.1)	12 (1.8)
Total	7337	135 (1.8)	457 (6.2)	121 (1.6)
Girls				
5	1085	37 (3.4)	148 (13.6)	11 (1.0)
6	1083	33 (3.1)	92 (8.5)	13 (1.2)
7	1090	19 (1.7)	76 (7.0)	16 (1.5)
8	1068	14 (1.3)	69 (6.5)	13 (1.2)
9	1061	11 (1.0)	33 (3.1)	21 (2.0)
10	1018	7 (0.7)	24 (2.4)	23 (2.3)
11	630	6 (1.0)	17 (2.7)	15 (2.4)
Total	7035	127 (1.8)	459 (6.5)	112 (1.6)

asked the parents if they consulted a doctor in the last 12 months about their child's difficulty in sleeping.

The following independent variables were included in the analysis: child's age, sex, reported birth weight and length of gestation, height and weight for height, parents' report of asthma attacks and wheeze in their child and whether the child suffered from wheeze most days or nights, father's social class, number of parents in the family, number of children in the family, household overcrowding, mother's age at child's delivery, mother's level of education, mother's height, mother and father's smoking behaviour in terms of number of cigarettes smoked at home, child's nocturnal enuresis, and ethnic background. In the inner city sample ethnic group was classified as white, Afro-Caribbean, children of families originating from the Indian subcontinent, and other (a heterogeneous group), to which were added England (representative sample) and Scotland (representative sample).

Height was measured on a specially designed stadiometer as described by Tanner *et al.*¹² Weight was measured with the child wearing underpants using electronic digital scales. Height was expressed in SD scores to adjust for age and sex and the index $\log_{10}[(\text{weight}-9)/\text{height}^{3.7}]$ was used as the measure of weight for height for the age range.¹³ The centiles for weight for height and the SD scores of height were based on the NSHG English 1992 data using the methods described elsewhere.^{13 14}

Table 2 Sleep problems in children with nocturnal enuresis or wheeze

	No (%) with sleep problems				Total No
	Disturbed sleep		Poor sleep	Sleeps well	
	≥1 a week	<1 a week			
Enuresis					
No enuresis					
<1 a week	183 (1.5)	658 (5.5)	183 (1.5)	11 002 (91.5)	12 026
≥1 a week	35 (2.3)	153 (10.3)	30 (2.0)	1 273 (85.4)	1 491
Not known	38 (5.7)	90 (13.4)	14 (2.1)	530 (78.9)	672
	6 (3.3)	15 (8.2)	6 (3.3)	156 (85.2)	183
Wheeze					
No wheeze					
Occasional wheeze	174 (1.4)	662 (5.5)	159 (1.1)	11 134 (91.8)	12 129
Persistent wheeze	28 (2.0)	135 (9.6)	31 (2.2)	1 218 (86.3)	1 412
Not known	52 (7.8)	103 (15.4)	37 (5.6)	475 (71.2)	667
	8 (4.9)	16 (9.8)	6 (3.7)	134 (81.7)	164

These are close to the new reference values, as the NSHG contributed the data for the 5 to 11 year old children.¹⁵

In a logistic analysis the dependent variable—disturbed sleep—was dichotomised as sleep disturbed at least once a week or less than once a week. Thus children whose parents ticked milder sleep disturbance options which may be associated with a greater awareness of their child's behaviour or lower parental threshold for identifying behaviour as disturbed were left in the group who had no sleep disturbance. The independent variables were those described above. Most of the variables were divided into three to six groups, including a category "not known" for each variable to minimise the number of children excluded from the study, except for child's gender and weight for height. Mother's height was included as a categorical variable to minimise losses in the logistic analysis. The cut off point for weight for height was the 90th centile. Child's height SD score was included as a continuous variable. The variables not associated with the dependent variable at the 5% level were eliminated from the final model. Another logistic analysis in which the dependent variable was "sleeps poorly but lies quietly when awake" (poor sleep from now on) was carried out. The dependent variables were the same as that used in the analysis above.

Results

From a total of 16 835 children in the age range 5 to 11 years, 14 372 (85%) of the parents provided information on disturbed sleep in their child. Just 50 children with data on sleep were excluded because information on sex, weight, or height were missing.

Table 1 shows the relation of sleep disturbance and age by sex. The prevalence of disturbed sleep, at least once a week or less than once a week, decreased with age in boys and girls. Poor sleep was unrelated to age in boys, but it increased slightly with age in girls. The prevalence of sleep problems was similar in both sexes in each of the age categories.

Children with nocturnal enuresis or wheeze more often had a sleep problem (table 2). Children with frequent nocturnal enuresis were more likely to have frequent disturbed sleep than other types of sleep problem. However, approximately 70% of the children with a sleep problem had no enuresis. There was an association between severity of wheeze and sleep problems. Thus more children with persistent wheeze had a sleep problem than children with occasional wheeze and these children had more problems than non-wheezers.

In the logistic regression analysis several factors were significantly associated with frequent disturbed sleep (table 3). Children originating from the Indian subcontinent and children in the default group "others" were more likely to have disturbed sleep ($p < 0.001$). Children whose mothers had no education or only primary education and those who did not disclose their education level were also more likely to have disturbed sleep ($p < 0.001$). Children with persistent wheeze were 4.5 times more

Table 3 Variables associated with frequent disturbed sleep (at least once a week). Odds ratios (OR) adjusted for all other variables. Final model*

Variables	Total	No (%)	OR (95%CI)	p Value
Nocturnal enuresis				<0.001
No enuresis	12 026	183 (1.5)	1.00	
Less than once a month	930	18 (1.9)	1.03 (0.62–1.69)	
At least once a month but less than once a week	561	17 (3.0)	1.60 (0.95–2.68)	
At least once a week	672	38 (5.7)	2.55 (1.75–3.72)	
Not known	183	6 (3.3)	1.47 (0.62–3.50)	
Wheeze				<0.001
No wheeze	12 129	174 (1.4)	1.00	
Occasional wheeze	1 412	28 (2.0)	1.43 (0.95–2.16)	
Persistent wheeze	667	52 (7.8)	4.42 (3.17–6.13)	
Not known how often	164	8 (4.9)	2.75 (1.29–5.89)	
Ethnic background				0.015
White (Scottish)	3 783	39 (1.0)	1.00	
White (English)	5 788	88 (1.5)	1.25 (0.85–1.84)	
White (English inner city areas)	1 720	34 (2.0)	1.01 (0.62–1.64)	
Afro-Caribbean	731	17 (2.3)	1.25 (0.68–2.30)	
Indian subcontinent	1 772	63 (3.6)	2.20 (1.34–3.60)	
Others	578	21 (3.6)	2.14 (1.19–3.84)	
Mother's education				<0.001
College or university	3 745	44 (1.2)	1.00	
Secondary education	8 140	129 (1.6)	1.14 (0.79–1.64)	
Primary education or no education	1 467	66 (4.5)	2.41 (1.51–3.84)	
Not known	1 020	23 (2.3)	2.01 (1.03–3.89)	
Father's social class				0.013
Non-manual	3 503	32 (0.9)	1.00	
Skilled manual	4 211	67 (1.6)	1.36 (0.87–2.12)	
Semiskilled and unskilled	2 301	47 (2.0)	1.44 (0.89–2.32)	
Not known	4 357	116 (2.7)	1.91 (1.25–2.92)	
Mother's smoking at home (cigarettes per day)				0.012
None	9 882	162 (1.6)	1.00	
1–9	1 316	34 (2.6)	1.93 (1.29–2.88)	
10–19	1 778	30 (1.7)	1.19 (0.78–1.83)	
≥20	855	23 (2.7)	1.87 (1.15–3.05)	
Not known	541	13 (2.4)	1.34 (0.74–2.45)	
Household overcrowding (No of people per room)				0.042
<1	5 484	87 (1.6)	1.00	
1–1.49	6 177	95 (1.5)	0.77 (0.56–1.05)	
≥1.5	1 745	62 (3.6)	1.15 (0.79–1.68)	
Not known	966	18 (1.9)	0.59 (0.30–1.17)	

*Adjusted for age.
CI = confidence interval.

likely to have disturbed sleep ($p < 0.001$). Nocturnal enuresis was also highly related to disturbed sleep ($p < 0.001$). Mother's smoking behaviour at home was also associated with disturbed sleep ($p < 0.001$), but the odds were high in the groups with very high cigarette consumption (20 or more) and moderate consumption (one to nine) and not in the interme-

diante group (10 to 19 cigarettes). Overcrowding was just significant in the final model ($p = 0.043$), but there was no clear pattern in the relation between people per room in the household and disturbed sleep. Those who did not disclose the father's occupation were more likely to have a child with disturbed sleep. There was a tendency for fathers in manual social classes to have children with disturbed sleep in comparison to those in non-manual social classes.

In a separate logistic regression analysis we assessed the factors associated with "sleeps poorly, wants attention, but lies quietly" (table 4). In the final model children with wheeze had poorer sleep than other children ($p < 0.001$). The odds ratios of children with persistent wheeze and occasional wheeze compared to children with no wheeze were 3.85 (95% confidence interval 2.65 to 5.60) and 1.88 (1.27 to 2.79) respectively. Ethnicity was also significantly associated with poor sleep ($p < 0.02$). White children from the inner city areas and those originating from the Indian subcontinent were more at risk of sleeping poorly than white Scottish children. Children whose birth order was fourth or later, or whose order was unknown, had poorer sleep ($p < 0.025$). The variables father's social class ($p < 0.02$), moth-

Table 4 Variables associated with poor sleep. Odds ratios (OR) adjusted for all other variables. Final model abridged*

Variable	Total	n (%)	OR (95% CI)	p Value
Wheeze				<0.001
No wheeze	12 129	159 (1.3)	1.00	
Occasional wheeze	1 412	31 (2.2)	1.88 (1.27–2.79)	
Persistent wheeze	667	37 (5.5)	3.85 (2.65–5.60)	
Not known how often	164	6 (3.7)	2.42 (1.04–5.60)	
Ethnic background				0.02
White (Scottish)	3 783	41 (1.1)	1.00	
White (English)	5 788	80 (1.4)	1.21 (0.83–1.76)	
White (English inner city areas)	1 720	46 (2.7)	1.88 (1.21–2.92)	
Afro-Caribbean	731	12 (1.6)	0.96 (0.49–1.89)	
Indian subcontinent	1 772	45 (2.5)	1.80 (1.14–2.83)	
Others	578	9 (1.6)	1.03 (0.49–2.16)	
Birth order				0.025
First	4 944	70 (1.4)	1.00	
Second or third	6 434	89 (1.4)	1.02 (0.73–1.42)	
Fourth or after	1 551	36 (2.3)	1.57 (0.99–2.49)	
Not known	1 443	38 (2.6)	1.90 (1.17–3.08)	

*Adjusted for age. As explained in the text other variables were associated with poor sleep, but only with the "not known" category.
CI = confidence interval.

Table 5 Frequency of consultation with doctor for children with a sleep problem

	Sleep problems					
	Disturbed sleep					
	≥ 1 a week		< 1 a week		Poor sleep	
	No	n (%)	No	n (%)	No	n (%)
Wheeze						
Persistent wheeze	43	19 (44.2)	85	29 (34.1)	34	10 (29.1)
Occasional	21	7 (33.3)	113	13 (11.5)	27	7 (25.9)
No wheeze	146	23 (15.8)	578	53 (9.2)	141	29 (20.6)
Ethnic group						
Scottish (whites)	34	10 (29.4)	181	18 (9.9)	35	11 (31.4)
English (whites)	69	17 (24.6)	365	39 (10.7)	73	18 (24.7)
English (inner city whites)	28	8 (28.6)	101	16 (15.8)	42	11 (26.2)
Afro-Caribbean	14	4 (28.6)	47	7 (14.9)	11	3 (27.3)
Indian subcontinent	52	10 (19.2)	68	13 (19.1)	39	3 (7.7)
Others	20	3 (15.0)	25	3 (12.0)	7	1 (14.3)
Mother's education						
College or university	37	6 (16.2)	203	17 (8.4)	40	10 (25.0)
Secondary education	104	28 (26.9)	477	57 (12.0)	110	30 (27.3)
Primary education or no education	56	13 (23.2)	57	11 (19.3)	39	4 (10.3)
Not known	20	5 (25.0)	50	11 (22.0)	18	3 (16.7)
Father's social class						
Non-manual	24	3 (12.5)	179	12 (6.7)	36	5 (13.9)
Skilled manual	54	13 (24.1)	216	21 (9.7)	61	11 (18.0)
Semi and unskilled manual	41	12 (29.3)	125	17 (13.6)	24	5 (20.8)
Not known	98	24 (24.5)	267	46 (17.3)	86	26 (30.2)
Nocturnal enuresis						
At least once a week	31	13 (41.9)	73	14 (19.2)	10	3 (30.0)
Less than once a week	11	4 (36.4)	49	6 (12.2)	9	1 (11.1)
Less than once a month	14	2 (14.3)	87	10 (11.5)	18	6 (33.3)
No enuresis	157	33 (21.0)	567	63 (11.1)	167	36 (21.6)
Maternal smoking at home (cigarettes per day)						
No smoking	132	27 (20.5)	517	56 (10.8)	142	25 (17.6)
1-9	27	6 (22.2)	84	10 (11.9)	17	8 (47.1)
10-19	25	7 (28.0)	100	14 (14.0)	22	4 (18.2)
≥20	21	9 (42.9)	43	9 (20.9)	23	9 (39.1)
Not known	12	3 (25.0)	43	7 (16.3)	3	1 (33.3)
Total	221	52 (24.0)	916	96 (12.2)	225	47 (22.7)

er's height ($p < 0.001$), or mother's age ($p < 0.005$) were significantly associated with poor sleep. Children who did not have the corresponding information slept poorly compared to children whose parents were in a non-manual social class, were first born in the family, or whose mother's height was less than 151 cm (not shown in table 4). Mothers who provided no information on age at child's delivery were less likely to have a child who slept poorly than those who gave birth the child before their 20th birthday (not shown in table 4).

Less than a quarter of the parents whose children had frequently disturbed sleep or poor sleep consulted a doctor about their sleep problem for advice (table 5). The proportion consulting a doctor was approximately 12% if the child had disturbed sleep and cried less than once a week. These percentages are inflated by other concomitant conditions in the child, as illustrated by the fact that children with wheeze or nocturnal enuresis with frequently disturbed sleep are more likely to consult a doctor about their sleeping problem (41% and 34%, respectively) than children without wheeze (16%) or nocturnal enuresis (21%). The parents of children originating from the Indian subcontinent and the default ethnic category "others" were less likely to consult a doctor for frequent disturbed sleep problems (19% and 15%, respectively) than parents of children from other ethnic groups

(between 25% and 29%). Parents of children whose mothers had higher education or whose fathers had a non-manual occupation tended to consult a doctor less often (16% and 13% respectively). Mothers who smoked heavily were more likely to consult a doctor about the child (43%).

Discussion

Sleep problems of varied nature and intensity affect approximately 20% of children at 5 years and 6% at 11. Less than 1% of the children had a serious sleep problem from age 9 onwards. The frequency of children with disturbed sleep and crying, but not with poor sleep, markedly decreases over the primary school years. A considerable proportion of the children with frequently disturbed sleep had another condition such as wheeze or nocturnal enuresis. Of the variables exploring social and behavioural background, we found that ethnicity, maternal education level, father's social class, and maternal smoking at home were associated with disturbed sleep.

We did not collect information on parental behaviour and it is possible that some parents' reports may have reflected parental disturbance rather than disturbance in the child. In spite of their limitations, parental perceptions are the only feasible method to use in a large survey, and most research has been based on parents' reports as the usual mode of inquiry.^{1 2 4 5} This study may help to identify

issues in relation to sleep disturbance that need further investigation with different methods. In such studies the inclusion of variables related to the child's development and to the interaction between children and their parents and other close relatives may be helpful. In the context of our study, in which sleep was only one of the aspects covered by the study, it would have been difficult to add a large number of items related to parents' psychological characteristics.

The marked decrease in the prevalence of disturbed sleep and crying with age suggests that for many children the problem is self-limiting and associated with delayed development. We preferred to assess the contribution of the independent variables in one analysis that included all age groups because—with the exception of nocturnal enuresis—most of these variables did not directly assess the child's developmental behaviour. A second issue, as indicated above, was the impracticability within the current research of including questions on parents' psychological problems or eliciting difficulties in the parent-child relations. This can be tackled in smaller samples focused mainly on sleep problems.

Sleep disorders in children are classified into two major groups: the *dysomnias* (difficulty in initiating or maintaining sleep) and *parasomnias* (disorders that disrupt sleep after it has been initiated).^{16, 17} In most surveys this division has not been followed. In our study the alternatives in the questionnaire identifying "sleep disturbed and child cries" would broadly measure the frequency of parasomnias, both nightmares and night terrors, while the alternative "child sleeps poorly but lies quietly" would be more likely to measure frequency of dysomnias. However, in children with a chronic condition such as wheeze the disturbed sleep may not correspond to the group of parasomnias or dysomnias. As the study forms part of a larger survey we were unable to explore the characteristics of the sleep disorders in children in more depth. Thus we were unable to distinguish between nightmares and night terrors.

Severely disturbed sleep is an infrequent phenomenon in British primary schoolchildren after the age of 6. Using a different question to assess sleep problems, Pollock also reported a prevalence of 1.4% of severe sleeping problems at age 5.¹ The prevalences reported in studies carried out in other countries have conveyed a very different picture of sleeping problems in preadolescent and adolescent children. Studies in Belgium, Sweden, New Zealand, and Spain have reported a prevalence of current sleep problems between 33% and 46%, well above the prevalence estimates in our study and Pollock's study in Britain.¹⁸⁻²¹ Although part of the discrepancy may be due to the different questions used to ascertain sleeping problems, these cannot explain the very extreme differences. Khan and colleagues reported that "night fears" alone had a prevalence of 15% in 8 to 10 year olds, and Vela-Bueno and colleagues reported a prevalence of night terrors and nightmares of approximately 30%.^{18, 20} "Night fears," or "night terrors plus

nightmares," should have been picked up in our study. In part the high prevalence in the Spanish study may be explained by the low response rate to their questionnaire (50%), but that was not a problem in the Belgian study.^{19, 21}

Our study showed that a large percentage of the children with severe disturbed sleep had wheeze (30%) and this was also reported by Pollock in relation to problems during infancy.² The prevalence of severe sleeping problems needs to be corrected for other conditions whenever possible. We suspect that chest tightness would be the cause of sleeping problems in the majority of the children with wheeze. This may indicate that asthma in these children is not appropriately managed. Support for this explanation is given by the fact that only 40% of the children with persistent wheeze consult a doctor for sleep disturbance. However, it is possible that some of these children may have been taken to the doctor for their asthma and the consultation was not considered to be related to sleep disturbance.

An excess of children with nocturnal enuresis may also have contributed to increase the prevalence of disturbed sleep. However, the causal relation between enuresis and sleep problems is difficult to establish in a cross-sectional study. Enuresis can affect sleep, a sleep disturbance may induce bedwetting, and the two conditions can coexist independently in the same child. The issue is further complicated by the inclusion of nocturnal enuresis among the parasomnias in the classification of sleep disorders and in some of the surveys.

In the current study we asked parents to disregard sleeping problems when the child was ill, but, based on the high association between wheeze and disturbed sleep, we suspect that most parents took the instructions to mean acute and not chronic illness when completing the questionnaire. This is supported by the fact that the proportion of children with sleep disturbance who had ever wheezed was similar in our study (18.6%) and in the British sample in the international study using the ISAAC protocol (18.7%), in which parents were asked whether their child had sleep disturbed by wheezing in the last year.²² It is possible that the percentage of severe sleep problems may need further correction for the existence of some other medical conditions which may affect sleep that we did not explore. Pollock showed that convulsions, ear discharge, eczema and wheeze were associated with sleeping problems in infancy.²

The steep decline in sleeping problems with age in our study provides indirect evidence that these problems have a good prognosis, as most children grow out of them during the primary school years. DiMario and Emery, in a small sample of children with night terrors, showed that resolution of the problem would occur within six years in most children, and in almost half of them within one year.²³ They were also able to show that for most children the highest intensity of the symptoms was reached during the first year of onset. Thus there is some evidence for advising parents that for most children the sleeping problem will be short

lived. However, several researchers have reported that sleep problems persist in a subgroup of children.^{1,5,24} This suggests that although for most the sleeping problem will be transient, for a minority the problem will be long lasting.

In the multiple logistic regression analysis, there was evidence that children of mothers with little education (only primary education or no education) and/or originating from the Indian subcontinent or "other" groups more often had severely disturbed sleep. Since most British mothers will finish secondary education, those in our study with only primary education are likely to be first generation immigrants into Britain. In this context both ethnicity and maternal education identify groups which may have recently experienced the stress of cultural change. Our study indicates that the children of immigrant parents with inadequate education are more at risk of sleep problems. In Pollock's study, based on children born in 1970, Afro-Caribbean children who formed part of an earlier immigration wave than Asians and "other" ethnic groups were found to be more at risk of sleep problems than children from other ethnic groups, whereas in our study their rate of sleeping problems was similar to white children in Britain.¹ This may indicate that the higher risk of sleep disturbance in children of some ethnic groups may correspond to a period effect, coinciding with recent immigration.

In our study there was some indication that children whose fathers were from manual social classes or whose mothers were smokers were more at risk of disturbed sleep. Pollock reported an association between child's sleeping problems and maternal smoking in infants, but not in 5 year olds.^{1,2} Smoking behaviour is related to poverty in Britain. The findings of this study would suggest that factors linked to social disadvantage may affect a child's sleeping behaviour.

Most parents who have a child with a sleeping problem do not consult a doctor. Our study indicates that even in the most severe cases of sleep problems parents are reluctant to ask for help. It is possible that some of these parents consulted a doctor for an associated problem, but from our experience with other conditions this would have been a minority. It is improbable that sleeping problems in the child would not affect family life. In relation to enuresis we found that half the parents did not consult a doctor. Thus a large percentage of parents whose children have a behavioural problem do not ask their doctor for help. In our study, parents of higher social and educational background consulted doctors less than other parents. However, parents of ethnic minorities—where sleeping problems are more prevalent—were also less likely to consult a doctor. We conclude that parents do not at present see sleep problems as an area where health services can help, or, if they think they can help, they have a psychological barrier to initiating a consultation.

In conclusion, the prevalence of disturbed sleep in Britain, although not rare, is well below figures based on studies in other countries.¹⁸⁻²¹ At least one third of the children with severe problems have coexisting physical or behavioural problems. Based on the risk factors associated with disturbed sleep, children in ethnic groups who have recently immigrated into the country and those from an underprivileged social background may be more at risk of the disorder. Our cross sectional study suggests that for most children the problem will not persist beyond primary school years.

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- 1 Pollock JI. Night-waking at five years of age: predictors and prognosis. *J Child Psychol Psychiatry* 1994;34:699-708.
- 2 Pollock JI. Predictors and long-term associations of reported sleeping difficulties in infancy. *J Reproduct Infant Psychol* 1992;10:151-68.
- 3 Jenkins S, Owen C, Bax M, et al. Continuities of common behaviour problems in preschool children. *J Child Psychol Psychiatry* 1984;25:75-89.
- 4 Richman N, Stevenson JE, Graham PJ. Prevalence of behaviour problems in 3-year-old children: an epidemiological study in a London borough. *J Child Psychol Psychiatry* 1975;16:277-87.
- 5 Zuckerman B, Stevenson J, Bailey V. Sleep problems in early childhood: continuities, predictive factors, and behavioral correlates. *Pediatrics* 1987;80:664-71.
- 6 Kerr S, Jowett S. Sleep problems in pre-school children: a review of the literature. *Child Care Health Dev* 1994;20:379-91.
- 7 Scott G, Richards MPM. Night waking in 1-year-old children in England. *Child Care Health Dev* 1990;16:283-302.
- 8 Gulliford MC, Price CE, Rona RJ, et al. Sleep habits and height at age 5 to 11. *Arch Dis Child* 1990;65:119-22.
- 9 Rona RJ, Chinn S. National Study of Health and Growth: social and biological factors associated with height of children from ethnic groups living in England. *Ann Hum Biol* 1986;13:453-71.
- 10 Osborn AF, Butler NR, Morris AC. *The social life of Britain's five year olds*. London: Routledge and Kegan Paul, 1984.
- 11 Clements J, Wing L, Dunn G. Sleep problems in handicapped children: a preliminary study. *J Child Psychol Psychiatry* 1986;27:399-407.
- 12 Tanner JM, Whitehouse RH, Takaishi M. Standards from birth to maturity for height, weight, height velocity and weight velocity: British children. *Arch Dis Child* 1966;41:613-35.
- 13 Chinn S, Rona RJ, Gulliford MC, et al. Weight-for-height in children aged 4-12 years. A new index compared to the normalised body mass index. *Eur J Clin Nutr* 1992;46:489-500.
- 14 Chinn S. A new method for calculation of height centiles for preadolescent children. *Ann Hum Biol* 1992;19:221-32.
- 15 Freeman JV, Cole TJ, Chinn S, et al. Cross sectional stature and weight reference curves for the UK, 1990. *Arch Dis Child* 1995;73:17-24.
- 16 Mindell JA. Sleep disorders in children. *Health Psychol* 1993;12:151-62.
- 17 Adair RH, Bauchner H. Sleep problems in childhood. *Curr Probl Pediatr* 1993;23:147-70.
- 18 Kahn A, Merckx C, Van de, Rebuffat E, et al. Sleep problems in healthy pre-adolescents. *Pediatrics* 1989;84:542-6.
- 19 Klackenbergh G. Sleep behaviour studied longitudinally: data from 14-16 years on duration, night-awakening and bed sharing. *Acta Paediatr Scand* 1982;71:501-6.
- 20 Vela-Bueno A, Bixler EO, Dobladez-Blanco B, et al. Prevalence of night terrors and nightmares in elementary school children: a pilot study. *Res Commun Psychol Psychiatr Behav* 1985;10:177-88.
- 21 Morrison DN, McGee R, Stanton WR. Sleep problems in adolescence. *J Am Acad Child Adolesc Psychiatry* 1992;31:94-9.
- 22 Pearce N, Weiland S, Keil U, et al. Self-reported prevalence of asthma symptoms in children in Australia, England, Germany and New Zealand: an international comparison using the ISAAC protocol. *Eur Respir J* 1993;6:1455-61.
- 23 DiMario FJ, Emery S. The natural history of night terrors. *Clin Pediatr* 1987;26:505-11.
- 24 Richman N. A community survey of characteristics of one- to two-year olds with sleep disruptions. *Am Acad Child Psychiatry* 1981;20:281-91.