ORIGINAL ARTICLE

Familial aggregation of sleep disorders – a questionnaire based study

J C Suri*, M K Sen*, Tulsi Adhikari**

*Department of Pulmonary, Critical Care & Sleep Medicine, Vardhman Mahavir Medical College and Safdarjang Hospital, New Delhi, **National Institute of Medical Statistics, ICMR, New Delhi.

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Abstract

A questionnaire-based study was performed amongst schoolchildren of Delhi and their first degree relatives to assess the sleep patterns. 2475 subjects were finally selected for analysis. It was observed that 10.8% of the children who had bruxism had no familial linkage. Whereas 42.6% of them also had a sibling who had bruxism, 44.4% had either one/both parents along with one/both grandparents with the disorder. In the case of snoring, 5.6% had no familial linkage, 45.5%, 9.7% and 7.5% had a linkage with siblings, parents/grandparents and parents as well as grandparents respectively. It can be inferred from these observations of the present study that the prevalence of most sleep disorders was the least in those children who had no familial linkage of the condition at all. The results of this study emphasize the urgent need to conduct more extensive genetic analyses to establish the causative factors, if any.

Introduction

Several studies have, in the past, contributed to the wealth of literature which suggests a familial link in the occurrence of various sleep disorders. The conditions range from various forms of sleep-disordered breathing (SDB), restless legs syndrome to insomnia. No such data, to the best of knowledge, has been compiled in India. A questionnaire-based survey was conducted, amongst schoolchildren in the NCR of Delhi and their siblings, parents and grandparents. The objective was to determine the familial aggregation of SDB in particular and various other sleep disorders in general, amongst first degree relatives in the various families.

Address for correspondence

Prof (Dr.) J. C. Suri
Consultant & Head
Department of Pulmonary
Critical Care & Sleep Medicine
Safdarjang Hospital, New Delhi
E-mail: jcsuri@rediffmail.com

Material and Methods

A validated sleep questionnaire was distributed to 4000 school children in the National Capital Region of Delhi. Of them, 2774 were received back and 2475 were finally selected for analysis as they satisfied all criteria for acceptance. The questionnaire used for this study was based on the Pediatric Sleep Questionnaire, University of Michigan as well as the Stanford Sleep Qusetionnaire.[19, 20] The total number of questions in the questionnaire was 52, in addition to questions pertaining to past/present medical problems, if any. Two schools belonging to two different geographical locations were selected. They represented all socio-economic strata residing in the area. The questionnaires were distributed through the class teachers and methods of filling them up were explained in detail. The set comprised of three different types of questionnaires that included one each for the student and his/her sibling, parents and grandparents. A letter from the Principal Investigator that was appended with the set of questionnaires included an appeal to participate and extension of all possible help with contact information. The parent were requested

to fill the questionnaire in case the child was less than ten years old. Data was collected as a part of another study that was conducted as a family survey and published earlier.[21-23]

The questionnaires were designed to obtain all possible information regarding all sleep parameters with the objective of identifying sleep disorders including SDB, snoring, sleep deprivation, insomnia, nightmare, EDS and periodic limb movements. It also included questions pertaining to the profile of co-morbidity, if any.

A randomly selected sub-group of fifty subjects, in whom any sleep disorder was diagnosed on the basis of the response to the questionnaire, were also examined clinically in the Sleep Clinic. The agreement between the clinical diagnosis and the questionnaire classification of sleep disorders was found to be good.

Observations

It was observed that 10.8% of the children who had bruxism had no familial linkage. Whereas 42.6% of them also had a sibling who had bruxism, 44.4% had either one/both parents along with one/both grandparents with the disorder. In the case of snoring, 5.6% had no familial linkage, 45.5%, 9.7% and 7.5% had a linkage with siblings, parents/grandparents and parents as well as grandparents respectively. Children with sleep deprivation had 54.9% and 45.5% linkage with siblings and parents as well as grandparents respectively. In case of insomnia, the sibling linkage was 50.7%, nightmare 77.4% and EDS 52.5% respectively. (Table 1)

Discussion

The occurrence of familial obstructive sleep apnea (OSA) was first reported by Strohl et al in 1978[1]. Several studies have highlighted the rate of genetic factors in the occurrence of OSA syndrome (OSAS) [2-9]. The prevalence of OSAS in the general population is about 2% to 4% and that of OSA 24% in men and 9% in women[10].

Besides male sex & middle age, other risk factors for OSAS in adults are a narrow upper airway (that includes features like retro-posed maxillae & mandibles, shorter mandibles, more depressed hyoids, longer soft palates, wider uvulae) and a narrower posterior airway space than those without OSA. In younger individuals, the pathogenesis of OSAS may include immaturity of the respiratory center in infants and adeno-tonsillar hypertrophy in children[11].

OSA has been recorded to be more frequent in infants with multiple family history of sudden infant death syndrome (SIDS), and apparent life-threatening events (ALTE) than those with a single family history of such events[12].

A robust familiar aggregation of insomnia has also been demonstrated in several studies[13].

In one study, habitual or disruptive snoring was present in 43.6% of family members, of whom 59.3% were adults and 40.7% were children or adolescents. Snoring alone without symptoms of apnea or gasping was found only in 23.1% of first-degree relatives [11]. In the same study, symptoms highly suggestive of OSAS ("gasping for air" and "cessation of breathing") were seen

Table 1: Various sleep parameters and their family linkage

Family Link Cross tabulation					
	Family Link				p-value
	No Link	Sibling	Parents OR Grandparents	Parents AND Grandparents	
BRUXISM	10.8%	42.6%	14.8%	44.4%	<.001
SNORING	5.6%	45.5%	9.7%	7.5%	<.001
SDB	1.5%	22.2%	1.9%	Nil	<.001
SLEEP DEPRIVATION	11.7%	54.9%	22.2%	45.5%	<.001
INSOMNIA	Nil	50.7%	15.6%	21.2%	<.001
NIGHT MARE	23.7%	77.4%	38.3%	43.3%	<.001
Excessive Daytime Sleepiness	9.8%	52.5%	15.1%	24.4%	<.001

in 20.4% of first-degree relatives (68 adults and 23 children). Symptom clusters without gasping or cessation of breath were also studied here. They included (a) snoring and excessive daytime sleepiness (EDS) (b) snoring and enuresis and (c) snoring, restless sleep and nightly awakenings. About 12.1% of first-degree adult relatives had such clusters of symptoms. About 6.9% of pediatric first-degree relatives also had such symptoms clusters. In addition, 43.5% of the 115 index children and adolescents had at least one relative with symptoms highly suggestive of OSAS.

Another questionnaire-based study by Redline et al reported that 21% of first degree relatives of the index cases with OSAS were found to have OSAS[16]. Douglas et al, in a combined questionnaire- polysomnogram study, also showed a 25% incidence of OSAS in first-degree relatives with sleep apnea[17].

In the analysis of the TESOAD (Tuson epidemiologic study of obstructive airway disease) study by Holberg et al, familial correlations for snoring showed significant mother-child and sibling correlations but not father-child correlations[18]. For sleep apnea, significant parent-daughter but not parent-son or sibling correlations were observed. Segregation analyses for snoring with regressive familial effects and siblings, age and obesity covariates showed no evidence of Mendelian transmission. This study reported a significant increase of familial insomnia, warranting further genetic studies in primary insomnia with early age at onset[18].

It can be inferred from these observations of the present study that the prevalence of most sleep disorders was the least in those children who had no familial linkage of the condition at all. Thus the strength of familial linkage is expressed by a larger prevalence.

Secondly, in all such children who have a sleep disorder, extensive efforts should be made to look for a similar condition in the sibling. This is amply demonstrated by the largest familial linkage of all sleep disorders amongst siblings.

Needless to say, any questionnaire based study has its own limitations. However, such close familial linkages amongst sleep disorders in children, as demonstrated by the present study as well as others, emphasizes the urgent need to conduct more extensive genetic analyses to establish the causative factors, if any.

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