

## SLEEP PATTERNS AND SLEEP DISORDERS IN PRIMARY SCHOOL CHILDREN IN QAZVIN, IRAN

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### Abstract

#### Objective

Sleep disorders are common in children; they also have a significant impact on the whole family, the parents in particular. Few studies in this field have been performed in Iran; hence the present study was carried out in order to determine sleep patterns and the prevalence of sleep disorders in school aged children in Qazvin.

#### Material and Methods

This cross sectional study was done on 300 students (150 males and 150 females) of elementary schools in Qazvin, selected from cluster random samples. The duration of the study was from November 2006 to February 2007, and data was acquired by means of a standard pediatric sleep questionnaire.

#### Results

The prevalence of sleep disorder among subjects was 44.3% (47.3% in males, and 41.3% in females), and the disorder was severe in 21% of the studied children. Sleep patterns during the school days differed significantly from what was observed on Fridays ( $p=0.000$ ). In addition, there was a significant difference between males and females in terms of duration of sleep on Fridays ( $p=0.014$ ).

#### Conclusion

Considering the high prevalence of sleep disorders in children, their harmful impact on the development of the nervous system and the child's learning and psychological health as well as on parental competency, and again bearing in mind the low level of awareness among the general population about sleep hygiene, we strongly recommend educational programs via public media and via meetings with the parents in schools.

**Keywords:** Sleep patterns, Sleep disorders, Children, Prevalence

### Introduction

Sleep plays a prominent role in the neurological development of children. It is not only essential for maintaining normal physical growth and psychological health, but is also vital for development of certain important functions such as concentration, learning, and cognition (1-3). In the past, children were generally assumed to be so called "good-sleepers", but recent studies do not support this (4); at present, it is believed that 43% of children experience at least one kind of sleep disorder.

Most of the sleep disorders tend to become chronic, and any long terms horticoming in sleep quality, will lead to deficits in learning abilities and psychological derangements (5). Also with acute presentation, sleep disorders may cause untoward effects on

cardiovascular, endocrine, and immune systems (6). The prevalence of sleep disorders in most of the previous studies has been reported to be 20-30% (7); based upon studies performed in India and Australia, 42.7% and 24.6% of children had sleep problems respectively (8-9). Sleep disorders are quite common but at the same time they are preventable and curable in the majority of cases, but regrettably do not receive appropriate attention from parents, and in many instances are not diagnosed even by physicians. Since, there is either a paucity of epidemiological data about sleep disorders in Iran or the data are inaccessible, we investigated sleep patterns and related disorders in school age children as a step toward prevention of problems faced by children with such conditions.

### Material and Methods

The present study is a cross sectional one, which reviews sleep patterns and related disorders in 7-11 year old school children in Qazvin, Iran.

For this study, a total of 300 students (150 males and 150 females) attending elementary schools in Qazvin were selected from 12 schools by the cluster method with randomization.

Qazvin is divided into two areas by the ministry of education; from each of these areas, 3 girls' and 3 boys' schools were randomly selected and from each school, 25 students (5 students from each grade) were randomly enrolled in the study. The selected students were each given a questionnaire to be filled out by their parents. We used the "Sleep Evaluation Questionnaire" the validity and reliability of which had been previously verified (10); the questionnaire has been translated, and then modified for the target population through a pilot study. The questionnaire initially covered demographic data, followed by questions related to children's sleep patterns during school days and week ends, and also about "day napping". In the second part of the questionnaire, the more common and important sleep disorders and parasomnias of children were dealt with, including: enuresis, nightmares, night terrors, sleep bruxism, sleep talking, sleep walking, and restless legs syndrome; in this section, for each sleep disorder, the parents could choose among any of six possible options, and this facilitated the determination of the severity of the problem. The

possible answers were as follows:

- I don't know;
- Never,
- Rarely = less than once per week,
- Occasionally = 1-2 nights per week,
- Often = 3-5 nights per week,
- Always = 6-7 nights per week.

Children with no history of sleep problems, and also those who were reported to have only rare problems were considered as "normal". Children in whom problems were reported occasionally, often, or always were classified as having a "sleep disorder". Among the group who had some kind of sleep disorder, the subgroup who reported the problem to occur often or always, were classified as having "severe sleep disorder". The exception to this rule were children with enuresis; in whom according to the definition, only those having wet nights 3 times per week or more (often or always) were assumed to have a sleep disorder (11).

After being filled by parents, the questionnaires were returned to school, to be completed by the teachers for some questions related to daytime drowsiness in school classes, and were finally collected by the researchers for statistical analysis using t-test and paired t-test by SPSS software.

To observe ethical principles, confidentiality of the data was kept; the parents consent was obtained prior to filling out of questionnaires; to encourage parents to fill the questionnaires precisely, not omitting any significant problems, a free psychological consult was offered to the children found to have significant sleep problems.

### Results

The prevalence of sleep disorders in the population studied was found to be 44.3%, and approximately half of these children had "severe sleep disorders" (table 1). Of the total 150 boys and 150 girls studied, sleep disorder was found in 71 (47.3%) and 62 (42.3%) cases respectively.

The average time of waking up during school days was 6:58 a.m. while on Fridays, the waking up time was 8:48 a.m., the difference being significant ( $p=0.000$ ). Also, during school days the mean time of going to bed was 10:10 p.m., while at Thursday nights it was 10:46 p.m., and the difference again was significant ( $p=0.000$ ).

The mean duration of sleep during school days was 9 hours 20 minutes for girls, and 9 hours 16 minutes for boys. On Fridays, this was 10 hours 27 minutes for girls and 10 hours 7 minutes for boys; the difference between school days and weekends was significant in both genders ( $p=0.000$ ). There was also significant difference between sleep durations on Fridays in boys and girls ( $p=0.014$ ); girls slept longer; however no such difference was seen on other school days ( $p=0.733$ ).

In this study, 44.3% of the children were found to have sleep disorders, the disorder was severe in 21%, i.e. at least occurred 3 nights or more per week. Seventy-eight (26%) of the children had only one type of sleep disorder; 39 (13%) had two types, and 25 (6.5%) suffered 3 or more types of sleep disorders.

The most common disorder was sleep talking that was seen in 42 (14%), and the least common was night terrors, found in 7 (2.3%) of the children. Restless legs syndrome was reported in 37 (12.3%), nightmares in 35 (11.7%), sleep bruxism in 33 (11%), enuresis in 29 (11.7%), daytime drowsiness in 20 (6.7%), and finally, sleep walking in 15 (5%) of the subjects (table 2).

All of the disorders were more common in boys than in girls with the exception of daytime drowsiness and sleep talking, which were seen slightly more frequently in girls. Out of 20 children with daytime drowsiness 12, and out of 42 cases with sleep talking, 24 were female. The prevalence of sleep disorders varied in different age groups; however no distinct trend of decreasing or increasing frequency, could be observed with growing of the children. The highest prevalence was seen in the 9 year-old children (55%) and the lowest prevalence in the 10 year-old age group. The prevalences in 7, 8, and 11 year-old age groups were 50, 36.7 and 48.3% respectively.

**Table 1:** The frequency and the relative frequency of children in terms of having sleep disorder, and its severity

Existence and severity of the sleep disorders	Frequency	Percent
Normal	167	55.7
Disordered	70	23.3
Severely disordered	63	21

**Table 2:** The frequency and the relative frequency of different sleep disorders for both sexes in the studied population

Sleep Disorders	Boys	Girls	Total	Boys	Girls	Total
	no	%	no	%	no	%
Sleep talking	18	12	24	16	42	14
Restless legs syndrome	27	18	10	6.7	37	12.3
Nightmares	22	14.7	13	8.7	35	11.7
Sleep bruxism	16	10.7	17	11.3	33	11
Enuresis	15	10	14	9.3	29	9.7
Daytime drowsiness	8	5.3	12	8	20	6.7
Sleep walking	10	6.7	5	3.3	15	5
Night terrors	6	4	1	0.7	7	2.3
None	28	18.7	54	36	82	27.3
Total	150	100	150	100	300	100

## Discussion

In this study the sleep patterns and disorders among elementary school students in Qazvin were investigated, and 44.3% of the children were found to have at least one type of sleep disorder, which was of severe degree in almost half (21%). Also a clear difference was shown in sleep patterns between schooldays and weekends.

Based on similar studies performed in developing countries, the prevalence of all of sleep disorders put together is estimated to be 20-50% in the pediatric population. Among the specific sleep disorders, sleep walking has been reported to be seen in 5-26%, night terrors in 1-6%, enuresis in 11-12%, and sleep talking in 5-20% of all children (11).

Similar studies found the overall prevalence of sleep disorders to be 47% in India (8), and 24% in Australia (9). The specific disorder types in India were found to be: enuresis 18%, sleep talking 14%, night bruxism 11%, nightmares 6.8%, sleep terrors 2.9%, and sleep walking 1.9% (8).

The overall prevalence of sleep disorders in children of our study is much the same as the pediatric population in India which could be attributed to cultural similarities between Iran and India. The lower rate of sleep problems reported from Australia may be explained in view of higher levels of knowledge of sleep hygiene among the people in that country.

In our study, most of the disorders were more prevalent in males, though daytime drowsiness and sleep talking were more common in girls. Also, the highest prevalence was seen in the 9 and 7 year age groups. Some of the disorders have been observed more frequently in males and others in females in similar studies performed in other countries. For instance in a study in Canada, restless legs syndrome was seen more often in females, but sleep talking and enuresis were more common in males. Additionally, with increasing age some of the problems became less common, but some others like night bruxism, restless legs syndrome, and sleep talking remained quite prevalent till 13 years of age (12). Besides, in a study from Washington D.C examining the relation between age and some of the sleep disorders, a relation was observed only with enuresis, but not for parasomnias and daytime drowsiness (13); the above findings regarding the relation between age and sleep disorder are compatible with findings of the present study.

There was a clear difference in this study in terms of sleep

durations between schooldays and weekends. We found that children went to bed and rose from sleep earlier on schooldays but slept longer on weekends. In addition though there was no significant difference in sleep length on schooldays between boys and girls, but on weekends girls slept longer. The same findings were reported from a similar study in Belgium indicating longer sleep durations on weekends; it became apparent that children's sleep length was not in concordance with their physiological needs (14), a finding in agreement with that of our study. In another study comparing sleep patterns between American and Chinese children, it was shown that Chinese children slept later, woke up earlier, their sleep length was shorter than their American counterparts, and had a higher prevalence of sleep disorders (15). The sleep length in our study was much the same as that of Chinese children. In our study, the mean duration of daily sleep was 9 hours and 16 minutes, and in Chinese children this was 9 hours and 6 minutes, compared to 10 hours and 46 minutes in the American children. It seems that the similarity in sleep length between Iranian and Chinese children is due to the similar working hours of elementary schools; schools open at 7:30 a.m. in these two countries but at 8:50 a.m. in the United States.

As regards the limitations of this study, the questionnaires were filled out only by parents and teachers, and no data was obtained directly from the children; direct interviews with the children perhaps could enhance the sensitivity of screening.

Generally speaking, this study revealed that the prevalence of sleep disorders is high in Iranian children, and the sleep pattern on schooldays is not proportional to their physiological requirements. In one study, parents were aware of their children's problem only in 4% of the cases, and general practitioners identified and referred only 9.7% of the cases (9).

In conclusion, considering the high prevalence of sleep disorders in children, their harmful impact on the development of the nervous system and the child's learning and psychological health and also on parental competency, and also keeping in mind the lack of awareness in the general population about sleep hygiene, we strongly recommend educational programs via public media and via meetings with the parents in schools. In addition, we strongly recommend that any child, brought to medical attention, whatever the cause, should preferably be screened for sleep disorders. Also we emphasize that this study needs to be repeated in other age groups of children and

in other parts of the country in search of possible varieties and also their probable causes such as cultural influences.

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