

# The Relationship between sleep habits and BMI among children 6 to 11 years old in Qazvin city, Qazvin, Iran, 2014

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**Abstract:** Introduction and objectives: sleep habits are formed in childhood and it affects quality and quantity of sleep lifetime. Some studies suggest that sleep deprivation is associated with weight and sleep deprivation is an effective factor in obesity and diabetes. The aim of this study was to evaluate the relation between sleep habits and body mass index among the children within the range of 6 to 11 years old in the city of Qazvin in 2014

**Methods:** the descriptive- cross sectional study was performed by participating 287 6 to 11 years old children (in private or public primary schools) in Qazvin through a random and cluster sampling. Data was collected using children sleep habits measurement tool and anthropometric questionnaire and was analyzed by using Pearson correlation coefficient.

**Result:** Maximum average of sleep problems in children were related to the sleep behavior and the least of children sleep problems were related to awakening at nights. The average BMI of boys ( $19.33\pm 4.09$ ) and girls ( $18.11\pm 0.56$ ) didn't have a significant difference ( $P>0.05$ ). Also, a significant relationship between the body mass index and sleep habits and its subscales wasn't seen ( $P<0.05$ ).

**Conclusion:** Since the children had a good body mass index, relationship between sleep habits and body mass index wasn't seen.

**Keywords:** sleep habits, body mass index, 6-11 years old Children.

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## 1. INTRODUCTION

Sleep habits formed during childhood is unique and affects the quality and quantity of sleep throughout the life [1, 2] increase of body mass index is along with sleep deprivation in all ages, and sleep deprivation is an effective factor in obesity and diabetes [2, 3]. Sleep plays very important role in child growth. Sleep is effective not only on the physical, behavioral and emotional growth of child but is a lot linked to mental performance, learning and attention [2 and 4]. Sleeping habits also reflect cultural differences and there are significant differences in this regard between the countries. The cultural and familial fields causes the formation of sleep habits in children and will keep the acquired habits throughout life, [2 and 5] learning the improper sleep habits also affects process of adult life causes the health of individuals and of society at risk. Child's inadequate sleep habits and behaviors will have complications such as: irritability, aggression, and headaches, digestive disorders... [2 and 6].

With get children to school ages it is expected to establish sleep patterns and descend undesirable sleep behaviors following growth and evolution process [1]. But the results of a study show that with get the adolescence period, sleep problems not only no fix, but affects caused of habitual sleep deprivation emerges in child [3 and 7]. Despite all these findings, sleep problem and its serious consequences on the health less considered by the experts [8].

Malnutrition is associated with mental health [9], including obesity is a multifactorial problem and therefore the interference between genotype and environment develops. Some complications of obesity in children include psychosocial complications, respiratory complications, cardiac- cardiovascular complications, metabolic complications. According to studies, 40 percent of obese children are also obese in adulthood [10 and 11].

Importance of obesity and its extension and spread is somewhat that it is predict in 2025 half of US population will be obese [12]. In cross- sectional studies, prevalence of overweight and obesity in children in the north of the country 11.5 and 15% and in people over 15 years old of Zanjan 30.7 and 15% have been reported [10]. From the other hand, many studies showed that overweight in adolescence and young is related to the phenomenon at a later period and increase complications of this period of life [7 and 10].

Since the treatment of obesity in adulthood is difficult, prevention of obesity in children is an important issue. So because of economic, psychological, social and medical complications of obesity, the importance of prevention and control is clear in the age [10, 12, 13].

The average of sleep duration is decreasing as progressive [2 and 3] and many reports suggest that increase of body mass index of all ages is along with sleep deprivation and it is effective factor in obesity and diabetes [3, 14, 15].

Given the importance of sleep and its important role on children growth and human health at all ages, the prevalence of sleep disorders in children and adolescence [4 and 6] and guidelines of World Health Organization based on improvement of the children sleep to 2020 [8] and reports based on probability of the risk of obesity in the people with poor sleep and reduced sleep duration in children than in the past [7].

Therefore, in this study the relationship between sleep habits and body mass index in Qazvin's 6 -11 years old children was investigated.

## 2. METHODS

This study is a cross- sectional study conducted by participating two hundred eighty-seven, 6 -11 years old children in the fall of 2014 in the city of Qazvin. Participants in the study were studying in zone one and two in Qazvin and samples were studied in cluster multistage. For this purpose, after obtaining the necessary permits, initially from every two areas of education, 14 schools were selected at random and then in each school, education grades were considered as a class, then from each grade of the school, students were randomly selected. The presenter by participating in parent- teacher meetings, expressed the purpose of the study for mothers and those who wish to cooperation and signed the consent form entered in the study. General profile and sleep information by mothers and anthropometric measurements were recorded by the host.

### **Research Tools:**

- Demographic specifications of (mother) contain questions (age, education, occupation, economic status, occupation and education of wives and the number of family members)
- Child Sleep Habits Questionnaire include:

**The first part:** the demographic data questionnaire, including children grade, birth, age, sex and type of school.

**The second part:** children's sleep habits assessment tool is a questionnaire that its reliability and validity was determined by Shoghi and colleagues [6]. The method to rate the answers in this questionnaire is based on the Likert and to any of the questions points 0-3 are awarded based on the type of answer. That is, if the behavior is repeated 5- 7 times in a week, option of usually is awarded (score: 3), 2- 4 times in a week, option of sometimes (score: 2), 0- 1 times in a week option of at all (score: 1). Also questions wear determined on 5 areas: lack of sleep, sleep behavior, morning wake up, daytime sleepiness and wakefulness during the night. The data were analyzed using SPSS 18 software and Pearson correlation statistical tests, independent t- test and ANOVA.

### 3. RESULTS

From 278 students, 197 teachers in government schools and 81 students in private schools were enrolled, from 278 children participating in the study, 156 female and 123 were male.

Evaluation of the mean scores showed the greatest difficulty of children sleep is related to the sleep behavior (boys = 38.35 and girls = 38.70) and the average of insomnia (male = 16.29 and female = 16.48). The fewest problems of children sleep is related to the night awakening (boys 5.37 and girls 5.53).

From 278 students, mean and standard deviation of boys' body mass index  $4.09 \pm 19.33$  and in girls  $18.11 \pm 0.56$  were obtained.

So we can say that the children in the study had have normal body mass index and had have not overweight.

Pearson correlation test (Table 4) result to examine the sleep habits and its subscales with BMI showed no significant association between body mass index and subscales of sleep habits  $(P > 0.05)$

### 4. DISCUSSION

The results of this study showed that in children, the most difficult of sleep is related to sleep treat and least difficult of them in the sleep is related to awaking at night. In the study of Liu in 2005 [16] drowsiness during the day and in the study of Shoghi 2005 [6] insomnia are the most common sleep treatment, as well as, in research Gomrokchi 2009 [1] awaking at night was most inappropriate sleep behavior, which is not affiliated with this study. In the study of Gomrokchi [1], the time of collecting the data was same the present study, but in the Liu [16] and Shoghi [6] study is not mentioned to the data collection. Since time to gather information may be effective on children sleep habits [2 and 8], this difference in findings may be resulted from cultural differences, disciplinary principles common among families of different societies and parent's executive ways to tuning children sleep program. By attention to abundance of children false habits and insomnia it is recommended that sleep quality and habits be considered in the school child, meanwhile, boys and smaller children the reason due to more spread of sleep problems in this group need particular attention. Also, it is necessary to educate proper solutions of sleep to families especially families with low literacy and stressful. Sleep habits scores is optimal in this study but is not similar to results of Shoghi et al 2005 and Gomrokchi and colleagues 2009 [1, 6].

Comparison of the amount of sleep of the two groups of 6 -11 years old boys and girls, showed no significant differences. So we can say that children gender had no relationship with the sleep amount of them, but in the study of Liu et al. 2005 girls had more insufficient sleep time than boys [16] that is not consistent with our study and this may be the result of cultural differences in the families. With regard to the mean number of sleepy days it is observed that girls were more days sleepy. Because the boys and girls in this study had the same night sleep, this drowsiness may be due to physiological issues [1].

In this study, mean of body mass index of boys and girls were calculated 19.33 and 18.11, respectively. The children surveyed in the study had almost normal BMI and had not overweight. The study of Borhani 2007 and Fesharaki 2009 indicate that teen's overweight [17 and 18], which was not consistent with our study.

In this study the relationship between sleep habits and body mass index were not found. But the child's weight and height had a positive relationship with an average score of sleep. Investigation of the relationship between sleep duration, physical activity and diet with the prevalence of children overweight by Santiago and colleagues 2012 [19], also showed that overweight in children with feeding and sleeping of them has a direct relationship. But in some studies these results have been not observed [20- 22]

In this study, Sylvia et al. 2005 [20] the risk of obesity, overweight, anxiety, depression and learning difficulties in the adolescents who had less than 8 hours sleep at a night in the childhood, was more. Also, Natanayal and colleagues study 2008 [21] on 7- 9 years old Portuguese children showed that there is a direct connect between children's sleep duration. The results of Skin and colleagues in 1996 [22] on the relation between lifestyle factors and sleep habits and obesity in 6- 7 years old Japanese children showed that sleeping late (the short duration of sleep) has a strong negative correlation with children obesity, and obesity was increased in children with reduced sleep duration [22], that none of them are not consistent with our study.

5. CONCLUSION

In this study, most children's sleep problems was related to children's sleep behavior and least sleep problems related to the awakening of the night. As in previous studies was seen the relationship between low weight and overweight and sleep, and in this study children's weight was in the normal range, also scores of sleep habits in this study were desirable, the cause of lack of the relationship between sleep habits and BMI seems these reasons. Of course, the time of study and cultural differences is also a factor in the results.

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**Conflict of interest:** All authors of this study declare that they have no conflict of interest.

**Ethical approval:** This article does not contain any studies with animals performed by any of the authors.

**Informal consent:** Informed consent was obtained from all participants included in this study.

TABLE 1. Demographic data

	Birth rank					Total
	I (percent)	II (percent)	III (percent)	IV (percent)	V (percent)	
<b>Total</b>	148 (53.6%)	111 (40.1%)	11 (3.6%)	7 (2.2%)	1 (0.4%)	278
	Number of family members					
	Two (percent)	Three (percent)	Four (percent)	Five (percent)	Six (percent)	
<b>Total</b>	5 (1.8%)	84 (30.2%)	161 (57.9%)	19 (6.8%)	9 (3.2%)	278
	Mother's education level					
	unread (percent)	Elementary (percent)	Guidance school (percent)	Diploma (percent)	University (percent)	
<b>Total</b>	5 (1.8%)	11 (4%)	38 (13.7%)	102 (36.5%)	121 (43.7%)	278
	Fathers' education level					
	Unread (percent)	Elementary (percent)	Guidance school (percent)	Diploma (percent)	University (percent)	
<b>Total</b>	0	17 (6.3%)	38 (13.8%)	88 (31.5%)	135 (48.6%)	278
	Family income level					
	Very low	Low (percent)	Average (percent)	Good (percent)	Excellent (percent)	
<b>Total</b>	0	9 (3.3)	166 (59.8)	99 (35.9)	4 (1.1)	278

TABLE 2. The mean and standard deviation of scores of the students in the subscales of child's sleep

Variable	Sex	Number	Average	Standard deviation
<b>Lack of sleep</b>	Boy	122	16.29	3.32
	Girl	156	16.48	2.71
<b>Sleep behavior</b>	Boy	122	38.35	3.77
	Girl	156	38.70	5.43
<b>Waking up in the morning</b>	Boy	122	11.29	1.56
	Girl	156	10.71	1.96
<b>Daytime sleepiness</b>	Boy	122	10.69	1.60
	Girl	156	10.57	1.54
<b>Night Awakening</b>	Boy	122	5.37	1.17
	Girl	156	5.53	0.91

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**TABLE 3. The mean and standard deviation of BMI of children**

	Sex	Number	Average	Standard deviation
<b>BMI</b>	Boy	122	19.33	4.09
	Girl	156	18.11	0.56

**TABLE 4. Correlation between subscales of sleep habits and body mass index of sample**

Variable	BMI	child Sleeping	Sleep behavior	morning Awakening	Daytime sleepiness	Night Awakening
<b>child Sleeping</b>	0.07					
<b>Sleep behavior</b>	0.03	0.14 *				
<b>morning Awakening</b>	0.01	0.25 *	0.18 *			
<b>Daytime sleepiness</b>	0.06	0.13 *	0.30 *	0.24 *		
<b>Night Awakening</b>	0.03	0.14 *	0.29 *	0.09	0.37 *	

\* P &lt; 0.05

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