

Investigating the Factors Affecting Sleep Problems among High-School Students in Yazd City, Iran

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Abstract

Background and Objective: Poor sleep, poor quality of sleep and sleepiness are among the common problems associated with learning, memory and educational performance in children and adolescents. Considering the lack of previous literature in this field, especially in the city of Yazd, Iran, a number of high-school students of the city participated in a study to assess sleep problems and influencing factors.

Materials and Methods: In this cross-sectional study, 740 high-school students in Yazd were selected using multi-stage cluster random sampling method. The data were collected using Pittsburg Sleep Quality Index (PSQI), reliability and validity of which had been proved (with Cronbach's alpha of 0.8). After encoding questionnaires, correlation and chi-square tests were used to evaluate the impact of corresponding factors on sleep quality via SPSS software.

Results: Of 740 students, 39% had sleep disturbances that had significant relationship with variables of gender, field of study, father's occupation, and father's education. Mean PSQI score did not have significant relationship with variables of mother's education, body mass index (BMI), students' birth, and mother's job. Furthermore, 16.7% of students were unsatisfied with their sleep pattern, while 3.5%, 58.7%, and 21.1% were very unsatisfied, satisfied, and very satisfied, respectively.

Conclusion: Teenagers' sleep may be affected by different factors such as sex, field of study, father's occupation, and father's education. Change in environmental and family condition could improve sleep disturbances, educational, and occupational performance.

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Introduction

Sleep is a high-level complex physiological and behavioral process in which the person is reversibly entered in a state of unconsciousness towards environment and lack of relational response (1). Sleep is considered to be a biological rhythm consisted of two stages:

1) Low-voltage or non-rapid eye movement (Non-REM), which in turn, consists of four levels: first and second levels of Non-REM are transient,

and have a relatively low threshold for awakening, while the third and fourth levels of Non-REM are known as slow-wave sleep (2).

2) The second stage of sleep is REM, in which, asleep person dreams and atonia in skeletal muscles and increased variability of autonomous system occur. In this stage, meaningful environmental stimulations are often embedded in the context of the dream, and thus would not cause awakening. Various periods of awakening occur during sleep, most of which the person does not remember (2).

Sleep disturbances are generally divided into two classes of dyssomnia and parasomnia. In terms of sleep duration, sleeping disturbances can be divided into insomnia and hypersomnia (oversleeping). Insomnia is typically defined as diffi-

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culty in initiating sleep or staying in it. It is considered to be most prevalent sleeping complaint, which might have transient or long-term episodes. Parasomnia usually occurs in third or fourth stages, and it is not usually remembered (3). Diagnosis of sleeping disturbance is rather cognitive, even though in some cases, specialized sleep lab tests are required (2).

Many researchers believe that, the first series of damages of improper sleep are demonstrated in the performance of the person, and ability of the brain to organize activities and also to remain in focus (4). Insufficient sleep and sleep deprivation lead to emotional and physiological alterations, consequently negatively influencing the educational performance in classrooms, and causing depression and alerting impacts on the cardiovascular and defense systems (5-7).

Lifestyle changes and behavioral alterations over the centuries have influenced sleeping patterns. Children with insomnia were angrier compared to their peers, as they miss more school hours. They are less successful in their educational achievements, are less satisfied with themselves, and even suffer more from diseases and emergencies as a result of lack of sleep. The effect of sleep on the process of growth and development doubles its importance in childhood and adolescence.

Despite the ever-growing complaints of the adolescents regarding the sleep problems and the effect of sleep disturbances on students' quality of social and educational life, few studies have been conducted in this field. This study attempted to examine the factors related to sleep disturbances in the adolescence, to pave the important steps towards the improvement of planning of sleep for adolescents, as education in high school has the most important effect on the future employment and culture of the person.

Materials and Methods

In this cross-sectional study, 740 high-school students of Yazd city, Iran, (with age range from 14 to 18 years old) were randomly selected using multi-stage cluster sampling method from 4 girls' and 4 boys' public high schools.

The data were collected using a two-part questionnaire. The first part included questions about demographic characteristics and risk factors for sleep quality. The second part of the questionnaire was the Pittsburg Sleep Quality Index (PSQI),

which is a self-reporting questionnaire best suited for measurement of sleep quality in adolescents. This questionnaire is a standardized questionnaire with 18 questions. These questions are classified into 7 components.

The first component relates to the subjective quality of sleep, which is determined by a single question (number 9). The second part corresponds to delays in falling sleep; the score of which is determined by the average of two questions i.e. the score of question 2 and the score of first part of question 5. The third part is related to the duration of sleep, which is determined by one question (number 4). The fourth part is associated with the effectiveness of sleep in adolescents. Its score is determined by the ratio of sleep duration to time spent on the bed by patient multiplied by 100. The fifth part is related to sleep disturbances, which is obtained by average score of sub-questions of question 5. The sixth part relates to the consumption of hypnotic drugs that is determined by question number 6. The seventh part is concerned with the improper performance during the day which is determined by the average scores of questions 7 and 8.

The score of every question has a range between 0 and 3, and the sum of the 7 components makes the final score of the questionnaire, obviously ranging from 0 to 21. The higher final score, the lower quality of sleep would be. Scores higher than 6, indicate difficulty in sleeping.

The reliability of PSQI was calculated to be 80% using Cronbach's alpha, and its validity was studied via test-retest, and the confidence range of 90% was obtained. The method of content validity was used to validate the questionnaire (8).

For data analysis process, the questionnaire was first coded, and data were entered in SPSS software (SPSS Inc., Chicago, IL, United States). Chi-square and correlation tests were used to evaluate the effect of corresponding factors on the quality of sleep.

Results

Of 740 students participating in the study that had age range between 14 and 18 years, 400 (53.8%) of them were female. The overall prevalence of sleep problems was 39%, which was significantly related to gender ($P = 0.014$), considering that sleep disturbances were higher in girls than boys (44.7 versus 32.2 percent; Table 1).

Among these students, 24.2% were in the first grade of high school, 156 (21%) students were studying in humanities, 204 (27.4%) in

Table 1. Relationship between variables with sleep disturbances

		Sleep quality			P value
		Favorable [Number (%)]	Unfavorable [Number (%)]	Total (Number)	
Sex	Female	99 (55.3)	80 (44.7)	179	0.014
	Male	103 (67.8)	49 (32.2)	152	
	Total	202 (66)	129 (39)	331	
Discipline	General	45 (54.9)	37 (45.1)	82	0.002
	Human	32 (50.8)	31 (49.2)	63	
	Experimental	54 (57.4)	40 (42.6)	94	
	Math	70 (77.8)	20 (22.2)	90	
	Total	201 (61.1)	128 (38.9)	329	
Father's occupation	Employee	53 (48.6)	56 (51.4)	109	0.007
	Self-employment	114 (65.9)	59 (34.1)	173	
	Other	31 (68.9)	14 (31.1)	45	
	Total	198 (60.6)	129 (39.4)	317	
Father's level of education	Illiterate	0 (0.0)	2 (100.0)	2	--
	School	39 (75.0)	13 (25.0)	52	
	Cycle	51 (68.9)	23 (31.1)	74	
	Diploma	62 (53.9)	53 (46.1)	115	
	Collegiate	48 (65.5)	37 (43.5)	85	
	Total	200 (61.0)	128 (39.0)	328	

Test: Chi-square

experimental sciences, and 200 (26.9%) in math discipline. Students of humanities had the highest ratio of sleep disturbances (49.2%), the least of which belonged to Math discipline (22.2%). Hence, a significant relation between discipline and sleep disturbance was observed ($P = 0.002$; Table 1).

Regarding the classification of occupational status of male parents, 230 (30.9%) were employees, 404 (54.3%) were self-employed and 102 (13.7%) were classified as other. Among female parents, 118 (15.9%) were employees, 592 (79.2%) were housewives, and 28 people were classified as other (3.8%). There was a significant relation between the father's occupation and sleep disturbances among the students ($P = 0.007$), with the highest ratios belonging to students with employee fathers. There was no relationship between sleep disturbance and the occupation of mother ($P = 0.551$; Table 1).

Moreover, there was a significant relation between the father's level of education and sleep disturbance among students ($P = 0.014$); students

with no or low educated fathers had less sleep disturbances compared to the ones with highly educated fathers. In this study, no significant association between the education level of mother and the sleep disturbance of adolescents was observed ($P = 0.086$) (Table 1).

There was a significant relationship between the average educational score and students' sleep disturbance ($P = 0.067$).

Regarding the order of birth, students had places between the first and the eighth. There was no significant relationship between birth order and sleep disturbance ($P = 0.610$).

Furthermore, 16.7 % of students were unsatisfied with their sleep pattern, while 3.5%, 58.7%, and 21.1% were very unsatisfied, satisfied and very satisfied, respectively. Totally, 13.7% of students were highly concerned with their sleep, 40.6% of them were lowly concerned, and 45.7% did not have any concerns regarding their sleep.

The results of Pearson correlation coefficient between sleep quality and other variables is presented in table 2.

Table 2. Pearson correlation coefficient between the sleep quality and other variables

Variable		Sleep quality	BMI	Insomnia Severity	Age	Average	Time to sleep	Time to wake up
BMI	Pearson coefficient	0.029	--	--	--	--	--	--
	P value	0.607	--	--	--	--	--	--
	Number	318	359	--	--	--	--	--
Severity of insomnia	Pearson coefficient	0.610	0.057	--	--	--	--	--
	P value	0.000	0.285	--	--	--	--	--
	Number	327	355	367	--	--	--	--
Age	Pearson coefficient	0.036	-0.064	0.096	--	--	--	--
	P value	0.519	0.223	0.067	--	--	--	--
	Number	331	359	367	372	--	--	--
Average	Pearson coefficient	0.023	-0.043	-0.111	-0.337	--	--	--
	P value	0.678	0.423	0.037	0.000	--	--	--
	Number	321	348	353	357	357	--	--
Time to wake up	Pearson coefficient	-0.05	-0.031	0.062	0.005	-0.145	-0.014	--
	P value	0.361	0.562	0.246	0.924	0.007	0.05	--
	Number	331	341	350	354	343	353	354
The amount of actual sleep at night	Pearson coefficient	-0.710	0.016	-0.349	-0.142	-0.024	0.243	0.260
	P value	0.000	0.764	0.000	0.007	0.651	0.000	0.000
	Number	331	345	354	358	344	356	346

BMI: Body mass index

Discussion

In this study, the frequency of sleep disturbances was 39%. In similar studies conducted by Ghoreishi and Aghajani (9), Araste (10), Fernandez-Mendoza et al. (11), Blair et al. (12), and Russo et al. (13), the associated frequencies were 40.6%, 50.7%, 37.2%, 35.7%, and 35.8%, respectively, which are all consistent with the results of our study.

The association of sex and sleep disturbances was significant in current study; studies conducted by Nojomi et al., (7), Higuchi et al. (14), Ghoreishi and Aghajani (9), Gomes et al. (15), BaHammam et al. (16), Modarresi et al. (17), and Oginska and Pokorski (18) also reported that sleeping disturbances are more frequent in girls than in boys, which might be due to the more emotional sensitiveness of girls to daily events and stress, especially in the period of adolescence.

In this study, a significant relationship between sleep disturbances and average educational score was obtained. In studies conducted by Moore et al. (19), Chervin et al. (20), Wolfson and Carskadon (21), Ancoli-Israel et al. (22), there was significant relationship between the intensity of insomnia and educational performance of adolescents, which is consistent with our findings. It has been revealed that sleep is critical in learning, memory processes and educational performances in adolescents, and improper sleeping attitudes severely hampers learning capacities and behavioral and neural functions.

In present study, we could not see a meaningful

association between sleep disturbances and mothers' occupation; yet the children of housewives showed less sleeping disturbances compared to others. In another similar study, it was revealed that insomnia and sleep disturbances were more prevalent in children of housewives compared to those of female employees, which is inconsistent with the findings of our study (23); this inconsistency may be due to cultural differences of societies. Moreover, it is reported that adolescents who had mothers with higher education suffered less sleep disturbances compared to others, which is consistent with our findings (23, 24).

Regarding sleep disturbance and father's occupation, Rona et al. (25) reported that the frequency of sleep disturbances in children who failed to report their fathers' occupation or had more physically intense jobs was higher compared to children who had fathers with intellectual occupation; the finding contrasts with the results of our study. In current study, students who had fathers working as engineers, instructors, and office employees demonstrated higher levels of sleep disturbance; this contrast may be due to cultural differences of societies and more access to leisure equipment and the internet which makes them stay more awake, leading to lower sleep quality which is also a result of more daily stress. This may justify the significant negative relationship between sleep disturbance and father's level of education.

Regarding sleep disturbances and BMI, no significant relation was observed. In a research conducted by Anderson et al. (26), reduction of sleep

duration had a negative linear association with BMI in boys, but it was not the case for the girls. Moreover, in similar studies, shortened duration of sleep was a factor for obesity (27, 28). In our study, however, there was no relationship between BMI and sleep duration or other sleep disturbances which can be due to the difference of employed questionnaires or cultural differences.

Since the information regarding sleep disturbances has been filled in schools, despite the description offered by the instructors, it is probable that not all the students were completely honest in filling the questionnaires. Thus, conducting similar studies on similar age group in environments rather than school and education facilities can be of great value.

The adolescents' sleep is clearly affected by their environment and families have important role in determining students' sleep patterns and preventing sleep disturbances. Hence, one of the more practical ways to improve sleep and mitigate sleep disturbances in adolescents is proper education regarding the sleep quality in the context of families.

Conclusion

Teenagers' sleep may be affected by different factors such as sex, field of study, father's occupation, and father's education. Change in environmental and family condition could improve sleep disturbances, and educational and occupational performance.

Conflict of Interests

Authors have no conflict of interests.

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