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Original Research Article.

Quality of Sleep among Male Secondary School Students in Khamis Mushayt City, KSA

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ABSTRACT

Background: Adequate sleep in adolescence is important for healthy development and proper daytime functioning. The evidence suggests that disturbances in the quantity and quality of sleep are associated with emotional and behavioral problems, somatic complaints, and overall quality of life among adolescents.

Objective: To investigate sleep quality and its associates among male secondary school students in Khamis Mushayt City.

Subjects and Methods: A total of 320 male secondary school students in Khamis Mushayt City were included. The Arabic versions of the Pittsburgh Sleep Quality Index and the Athens insomnia scale were applied in addition to the socio-demographic and personal characteristics of the participants.

Results: About two thirds of male secondary school students (61%) had poor quality of sleep, while 39% had insomnia. Prevalence of poor sleep quality and insomnia significantly increased with students' age (p=0.042 and p=0.018, respectively) and higher students' scholastic year, especially among students in the Science section (p<0.001 and p=0.002, respectively). Quality of sleep differed significantly according to intake of soft drinks at night (p=0.003). Prevalence of insomnia was significantly higher among students who take stimulant drugs, sedative drugs, drink soft drinks at night or smoke cigarettes (p=0.015, p<0.001, p=0.027 and p<0.001, respectively).

Conclusions: About two third of male secondary school students in Khamis Mushayt City have poor quality of sleep while about one third of them have insomnia. Prevalence rates of poor sleep and insomnia significantly increase with secondary school students' age and higher students' scholastic year. Insomnia is significantly higher among secondary school students who smoke or on substance abuse.

Keywords: Insomnia, Sleep Quality, Adolescents, Pittsburgh Sleep Quality Index.

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INTRODUCTION

Sleeping disorders are defined as repeated difficulty with the initiation, duration, maintenance, or quality of sleep that occurs despite adequate time and opportunity for sleep and results in some form of daytime impairment.[1]

Adequate sleep in adolescence is important for healthy development and proper daytime functioning. The evidence suggests that disturbances in the quantity and quality of sleep are associated with emotional and behavioral problems, somatic complaints, and overall quality of life among adolescents.[2-7]

Sleep is crucial for the learning, memory processes, and school performance of adolescents.[8] Adequate sleep has been shown to boost the immune system, which helps to fight infections; thus, sleep may reduce a child's risk of getting sick.[9] The psychological health of adolescents can be affected by sleep duration, with shorter sleep durations in adolescents having been linked to depression and an increase in suicide ideation.[10] According to the National Sleep Foundation,[11] in Arlingon, Virginia, USA, the recommended sleep duration for adolescents is 9 hours per night for optimum health and development. Sleep duration is not the only indicator of sleep. Sleep quality and excessive daytime sleepiness are significant indicators of sleep outcome. Sleep quality refers to continuous sleep without any interruption.[11]

Good sleep quality can be characterized by the occurrence of certain conditions such as the early onset of sleep, fewer interruptions, and fewer early awakenings. Good sleep quality is also associated with a wide range of positive outcomes such as better health, greater well-being, and better psychological functioning among adolescents.[12] Inadequate or disrupted sleep can directly result in excessive daytime sleepiness. Adolescents with daytime sleepiness are likely to experience reduced alertness, compromised daytime functioning, and impaired mood.[3,13,14] This study was carried out to investigate sleep quality and its associates among male secondary school students in Khamis Mushayt City, Saudi Arabia.

SUBJECTS AND METHODS

This cross-sectional study has been conducted in secondary governmental schools for boys in Khamis Mushayt City, which is located at the south-western part of Saudi Arabia, east of Abha City. It has a population of 372,690.[15] Khamis Mushayt city includes 28 male governmental secondary schools with an overall 8173 students. All male students registered for the scholastic year 1435-1436H at governmental secondary schools in Khamis Mushayt constituted the study population. The total number of male students registered in governmental secondary schools in Khamis Mushayt City for the scholastic year 1433-1434 H was 8173 students, distributed over 28 schools. The sample size was calculated using the single proportion equation in Raosoft software package. The required minimal sample size was 291 students at 95% confidence intervals (assumed prevalence of disturbed sleep quality of 50%, and a margin of accepted error of 5%). The sample has been increased to 320 in order to compensate forany incomplete responses. A multistage, random sample was applied by selecting schools and students from the Directorate of Education in Khamis Mushayt. The total number of governmental secondary schools for boys is 28 and the total enrollment of these schools was 8173 students. The sample size was estimated to be 320 students. Three schools were randomly selected by drawing the names of schools from the sampling frame. After that, three classes of students were randomly selected from each school using a simple random sampling technique (scholastic grades 1, 2 and 3).Thus, 9 classes were included. All students in the selected classes were invited to participate in the study until the required sample size of 320students has been fully achieved. The following table shows the distribution of participant students according to their scholastic grades:

Table 1: Distribution of participant students according to their scholastic grades

Scholastic class	No.	%
First	61	19.1
Second (Science)	64	20.0
Second (Arts)	65	20.3
Third (Science)	66	20.6
Third (Arts)	64	20.0

The Arabic versions of the Pittsburgh Sleep Quality Index[16] and was applied in addition to the socio-demographic and personal characteristics of the participants. Students' midterm grades were classified as follows: Excellent: ≥90%, Very good: 75-89.9%, Good: 65-74.9%, Pass: 50-64.9% and Fail: <50%.

The Arabic version of Pittsburgh Sleep Quality Index (PSQI): It measures the quality and patterns of sleep. It differentiates "poor" from "good" sleep by measuring seven areas: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction over the last month. Scoring of answers is based on a 0 to 3 scale, whereby 3 reflects the negative extreme on the Likert Scale. A global sum of "5" or greater indicates a "poor" sleeper. Reliability and validity of PSQI produced a sensitivity of 89.6% and a specificity of 86.5% of patients versus control subjects. This cutoff score correctly identified 84% of patients with disorders of initiating or maintaining sleep, 89% of patients with disorders of excessive sleepiness, and 97% of depressed patients.[16] Psychometric estimates showed that the Pittsburgh Sleep Quality Index is both reliable and valid for measuring sleep disturbances among Arab populations. Permission has been ordered to obtain and use the Arabic version through an e-mail to the corresponding author. Students who were eligible to participate were given the self-administered questionnaires in their classes, along with direct instructions from the researcher. They were informed that collected data within this survey is fully confidential and anonymous, and any student is free to withdraw from participating in this study at any time without being exposed to any penalty. The researcher then collected the completed questionnaires sheets. Data collection was conducted during April, 2015.

All the necessary official approvals were fulfilled. Data entry and analysis were performed using the Statistical Package for Social Sciences (SPSS version 20.0) software. Descriptive statistics were computed, in the form of frequency and percentage for categorical data and in the form of measures of central tendency and dispersion (mean and standard deviation were calculated. Testing significance (e.g., chi-square test) was computed for categorical variables. Differences were considered as statistically significant when the p-values were less than 0.05.

Table 2: Personal characteristics of male secondary school students, Khamis Mushayt City, 2015

Personal characteristics	No.	%
Age (years)		
• 15-16 years	78	24.4
• 17-18 years	199	62.2
• > 18 years	43	13.4
Nationality		
• Saudi	286	89.4
• Non-Saudi	34	10.6
Residence		
• Rent	96	30.0
• Own	224	70.0
Chronic diseases		
• No	276	86.3
• Yes	44	13.8
Midterm Grade		
• Fail	23	7.2
• Pass	13	4.1
• Good	36	11.3
• Very Good	84	26.3
• Excellent	164	51.3

RESULTS

Table (2) shows that the age of about one fourth of students (24.4%) was 15-16 years, while about two thirds of them (62.2%) aged 17-18 years and 13.4 were more than 18 years old. Most participant students were Saudi (89.4). More than two thirds of students (70%) lived in a house of their own. A total of 44 students (13.8%) had chronic diseases. More than half of students (51.3%) obtained excellent grades in their midterm exam, 26.3% had very good grades, while 7.2% failed.

Table (3) shows that about two thirds of students (67.8%) had less than 5 brothers, while 70% of them had less than 5 sisters. The educational level of most students' fathers was either secondary (30.6%) or university (23.5%). On the other hand, 23.8% of

mothers were illiterate, 21.3% had primary education, 21.6% had secondary education and 20.3% had university education. Almost one third of students' fathers were retired (31.3%) and 33.8% were military personnel. About one fifth of students' mothers (20.3%) were employed.

Table (4) shows that 14.4% of students sometimes take stimulant drugs while 1.3% always takes stimulant drugs. On the other hand, 23.8% of students sometimes take sedative drugs while 1.3% always takes sedative drugs. Moreover, 15% of students were smokers.

Figure (1) shows that 194 students (61%) had poor quality of sleep.

Table 3: Family characteristics of male secondary school students, Khamis Mushayt City, 2015

Family characteristics	No.	%
Number of brothers		
• 0-4	217	67.8
• 5-9	87	27.2
• 10+	16	5.0
Number of sisters		
• 0-4	224	70.0
• 5-9	57	17.8
• 10+	39	12.2
Father's educational level		
• Illiterate	39	12.2
• Primary	55	17.2
• Intermediate	53	16.6
• Secondary	98	30.6
• University	75	23.5
Mother's educational level		
• Illiterate	76	23.8
• Primary	68	21.3
• Intermediate	42	13.1
• Secondary	69	21.6
• University	65	20.3
Father's occupation		
• Retired	100	31.3
• Military	108	33.8
• Governmental/Private sector	88	27.5
• Others	24	7.5
Mother's employment		
• Unemployed	255	79.7
• Employed	65	20.3
Monthly income		
• <10000 SR	178	55.6
• >10000 SR	142	44.4

Table 4: Personal habits of male secondary school students, Khamis Mushayt City, 2015

Personal habits	No.	%
Taking stimulant drugs		
• Never	270	84.4
• Sometimes	46	14.4
• Always	4	1.3
Taking sedative drugs		
• Never	239	74.7
• Sometimes	76	23.8
• Always	4	1.3
Drinking soft drinks at night		
• Never	75	23.4
• Sometimes	170	53.1
• Always	75	23.4
Smoking status		
• Smoker	48	15.0
• Nonsmoker	272	85.0

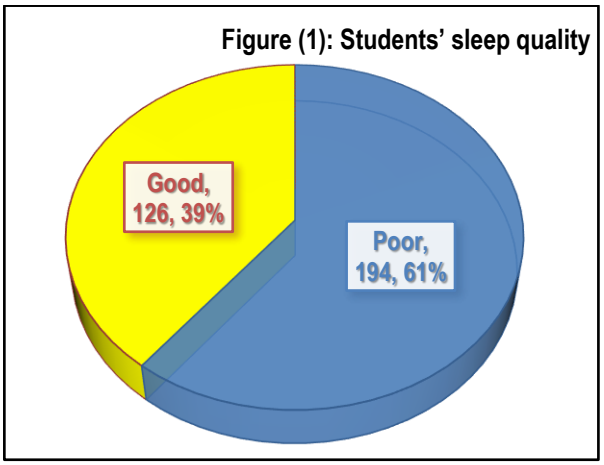

Table (5) shows that prevalence of poor sleep significantly increased with students' age (p=0.042). Similarly, prevalence of poor sleep significantly increased with higher students' scholastic year, especially among students in the Science section (p<0.001). However, quality of sleep did not differ significantly according to nationality, type residence, presence of chronic diseases or grades of midterm exam.

Table (6) shows that students' quality of sleep did not differ significantly according to their family characteristics.

Table (7) shows that quality of sleep differed significantly according to students' drinking habit of soft drinks at night (p=0.003). However, students' quality of sleep did not differ significantly according to their habits of taking stimulant drugs, sedative drugs or smoking status.

Table 5: Male secondary school students' quality of sleep according to their personal characteristics, Khamis Mushayt City

Personal characteristics	Good		Poor		p
	No.	%	No.	%	value
Age (years)					
• 15-16 years	40	51.3	38	48.7	
• 17-18 years	72	36.2	127	63.8	χ^2=6.32
• > 18 years	14	32.6	29	67.4	P=0.042
Nationality					
• Saudi	109	38.1	177	61.9	χ^2=1.79
• Non-Saudi	17	50.0	17	50.0	P=0.197
Type of residence					
• Rent	42	43.8	54	56.3	χ^2=1.10
• Own	84	37.5	140	62.5	P=0.319
Chronic diseases					
• No	112	40.6	164	59.4	χ^2=1.22
• Yes	14	31.8	30	68.2	P=0.320
Midterm Grade					
• Fail	11	47.8	12	52.2	
• Pass	8	61.5	5	38.5	
• Good	19	52.8	17	47.2	
• Very Good	33	39.3	51	60.7	χ^2=8.41
• Excellent	55	33.5	109	66.5	P=0.078
Scholastic year					
• First	32	52.5	29	47.5	
• Second (Science)	23	35.9	41	64.1	
• Second (Arts)	31	47.7	34	52.3	
• Third (Science)	2	3.0	64	97.0	χ^2=53.82
• Third (Arts)	38	59.4	26	40.6	p<0.001

Table 6: Male secondary school students' quality of sleep according to their family characteristics, Khamis Mushayt City

Family characteristics	Good		Poor		P
	No.	%	No.	%	value
No. of brothers					
• 0-4	88	40.6	129	59.4	
• 5-9	30	34.5	57	65.5	χ^2=1.76
• 10+	8	50.0	8	50.0	p=0.416
No. of sisters					
• 0-4	84	37.5	140	62.5	
• 5-9	22	38.6	35	61.4	χ^2=2.66
• 10+	20	51.3	19	48.7	p=0.264
Father's educational level					
• Illiterate	19	48.7	20	51.3	
• Primary	23	41.8	32	58.2	
• Intermediate	21	39.6	32	60.4	
• Secondary	38	38.8	60	61.2	χ^2=2.73
• University	25	33.3	50	66.7	p=0.605

Mother's educational level					
• Illiterate	35	46.1	41	53.9	
• Primary	28	41.2	40	58.8	
• Intermediate	15	35.7	27	64.3	
• Secondary	26	37.7	43	62.3	χ^2=2.66
• University	22	33.8	43	66.2	p=0.616
Father's occupation					
• Retired	34	34.0	66	66.0	
• Military	46	42.6	62	57.4	
• Governmental/Private	35	39.8	53	60.2	χ^2=3.63
• Others	11	45.8	13	54.2	p=0.603
Mother's employment					
• Unemployed	102	40.0	153	60.0	χ^2=0.21
• Employed	24	36.9	41	63.1	p=0.673
Monthly income					
• <10000 SR	78	43.8	100	56.2	χ^2=3.32
• >10000 SR	48	33.8	94	66.2	p=0.068

Table 7: Male secondary school students' quality of sleep according to their personal habits, Khamis Mushayt City, 2015

Personal habits	Good		Poor		p
	No.	%	No.	%	value
Taking stimulant drugs					
• Never	111	41.1	159	58.9	
• Sometimes	14	30.4	32	69.6	χ^2=2.23
• Always	1	25.0	3	75.0	p=0.328
Taking sedative drugs					
• Never	102	42.7	137	57.3	
• Sometimes	23	30.3	53	69.7	χ^2=4.08
• Always	1	25.0	3	75.0	p=0.130
Drinking soft drinks at night					
• Never	42	56.0	33	44.0	
• Sometimes	59	34.7	111	65.3	χ^2=11.38
• Always	25	33.3	50	66.7	p=0.003
Smoking status					
• Smoker	23	47.9	25	52.1	χ^2=1.73
• Nonsmoker	103	37.9	169	62.1	p=0.189

DISCUSSION

Adolescence is a time of tremendous growth; physically, cognitively, socially, and emotionally. Good sleep habits are very important for adolescents and emotional well-being. Many high school-age students sleep less than eight hours when their bodies actually need nine hours a night. Most adolescents do not realize the importance of sleep or simple actions they can practice to improve the quantity and/or quality of their sleep.[17]

This study revealed that 61% of male secondary school students in Khamis Mushayt had poor quality of sleep.

Quach et al.[18] showed that sleep problems among schoolchildren are common, of whom 22.7% having sleep problems. However, several studies reported different rates for sleep problems among school students. Amintehran et al.[19] reported that sleep problems are experienced by 25-30% of adolescents. Wheaton et al.[20] reported that secondary school students did not sleep enough hours, experienced poor sleep quality, and experienced negative consequences for these behaviors.

Hirshkowitz et al.[21] emphasized that adolescents aged 14–17 years should sleep 8–10 hours per night. Adolescent Sleep Working[22] recommended that to help ensure that adolescents get adequate sleep, they can practice good sleep hygiene (i.e., habits that promote good sleep). These habits include going to bed and getting up at the same time each day both during the school week and weekends, minimizing light exposure in the evenings, and keeping electronic devices, such as computers, video games, and cell phones, out of the bedroom. Parents can help by setting bedtimes and limiting when and where their teenagers can use electronic devices. Early school start times contribute to insufficient sleep among adolescents. Delaying school start times has been proposed as a means of allowing adolescents to get adequate sleep.

Results of this study showed that substance abuse is not uncommon among male secondary school students. Regarding stimulant drugs, 14.4% sometimes take them, while 1.3% always take it. Regarding sedative drugs, 23.8% of them sometimes take them while 1.3% always take sedative drugs. Moreover, prevalence of smoking among male secondary school student was high, as 15% of students were smokers.

The high prevalence of smoking among male secondary school students in Khamis Mushayt City is not surprising. Several studies consistently reported the high prevalence of smoking among male students in Saudi Arabia.

Fida and Abdelmoneim[23] noted that despite its decline in developed countries, the rate of smoking in developing countries is still high. Bassiony[24] reported that prevalence of current

smoking among school students ranged from 12% to 29.8%. Almutairi[25] noted that prevalence of smoking is in high among Saudi students. Mandil et al.[26] added that cigarette smoking is increasing among young people, especially in Gulf nations such as Saudi Arabia, with prevalence of smoking of 14.5% among students.

These findings should ring a warning bell that substance abuse may constitute a sweeping pandemic among adolescents in Saudi Arabia. Gillum et al.[27] noted that it is interesting to observe how a conservative society such as the Saudi society, where smoking was socially, traditionally, and above all religiously banned, has been affected by the tobacco smoking pandemic to reach such high prevalence levels.

Jeram[28] emphasized the role of friends in substance abuse among secondary school students. He stated that since “birds of a feather flock together”, students who abuse drugs will most probably have friends with similar habits in their peer group. The greater the student’s involvement with friends, that smoke, consume alcohol, or abuse drugs, the greater his chances of becoming addicted.

Van Niekerk[29] emphasized that the use of illicit drugs is taking on epidemic proportions among youth. Children tend to become involved with sedative and stimulant drugs at a young age. There is also considerable abuse of over the counter and prescription medicines.

Fida and Abdelmoneim[23] argued that, nowadays, about half of the population in Saudi Arabia is thought to be smokers and the country ranks fourth in cigarette import worldwide, with an annual increase of around 3% of tobacco consumption. Meanwhile, there are no regulations to prevent Saudi youth from purchasing or using tobacco, which is being freely sold at a relatively low cost.

The current study revealed that prevalence of poor sleep is significantly increased with students’ age and higher students’ scholastic year, especially among students in the Science section ($p<0.001$).

These findings are in agreement with those of several studies. Davidson[30] reported that age directly affected average weekday sleep length, average weekend day sleep length and overall sleep quality, that are consistent with Ban and Lee’s[31] findings.

The significantly increased prevalence of poor sleep was exclusively among students of the “Science” section can be explained by the nature of studied scientific subjects (e.g., mathematics, chemistry, physicians, biology) which necessitate much thinking and memorization, more than those of the Arts section (e.g., history, geography, literature).

However, prevalence of poor sleep quality did not differ significantly according to other personal characteristics, i.e., nationality, type residence, presence of chronic diseases or grades of midterm exam. Moreover, poor sleep quality did not differ significantly according to family characteristics.

This study showed that poor quality of sleep among participants differed significantly according to students’ drinking habit of soft drinks at night.

These findings are in agreement with those of Pallos et al.[32], who reported a relationship between tobacco use and sleep problems and difficulties, and a significant association between sleep problems and consumption of tobacco ($P = 0.0016$). Hamidovic and de Wit[33] showed that smoking disrupts sleep in two ways. First, as bedtime approaches, the smoker has a final "relaxing" smoke before retiring. That smoke may seem relaxing, but nicotine is actually a stimulant, and smoking cigarette is almost as sleep disrupting as drinking a cup of coffee. In addition, smoking disrupts sleep in yet another way. During the night, the smoker goes hours without a cigarette. This leads to discomfort and mild withdrawal, making it difficult to fall into a deep sleep. The light sleep is not sufficient for the smoker to awake refreshed (and struggle with his smoker's cough) in the morning.

Several researchers reported sleep problems associated with the use of illicit drugs. Most of them reported insomnia-related symptoms, such as difficulty falling and maintaining sleep.[34,35]

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