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The Quality of Sleep among Adolescents in the City of Jeddah during Summer Vacation

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Abstract: **Aim of this study is to estimate the Prevalence of poor quality of sleep among adolescents in Jeddah during summer vacation, to know to which extent do these factors affect the quality of sleep among Jeddah's adolescent population during summer vacation and To compare multiple factors and its effect on the sleep quality. Methods: A cross-sectional study was conducted in 2016 in Jeddah, Saudi Arabia. Adolescents were evaluated by online Google form distributed through social networking, between August 2016 to September 2016. The questions were divided to demographic data, questions to assess sleep quality according to Pittsburgh Sleep Quality Index (PSQI), and questions to assess each specific factor (diet, obesity, video games, TV, social life, chronic medical illness, and physical activity). Quality of sleep was determined by using Sleep Quality Index (PSQI) which it divided into 2 categories: good (A total score of less than 5) and poor (A total score of 5 or greater). Demographic/lifestyle factors were collected and analyzed as factor affecting quality of sleep. Results: A total of 202 respond to the electronic questioner and the result showing that females represented 56.4% of the sample. About 79% of 62 responds sleep in a dark room, 67.5% of 80 responds have TV in their bedroom and 55% of 169 responds had more than 3 social gathering in the past week. Around 92% of the adolescent were found to have a PSQI global score of >5, which reflects Poor quality of sleep (Figure 1). Poor quality of sleep was significantly higher in adolescent using electronic devices before sleep (P = 0.001), not drinks milk before sleep (P = 0.001) and self-assessment (P = 0.005) .(Table 2). While there is no significant association between quality of sleep and other factors such as gender, Education, Having Dinner ,Vitamin B supplements, Type of summer activities ,Meting people, have TV in bedroom, Sharing bedroom, Sleeping with light on, Sleeping in noise and Exercise last week. Conclusion: Poor quality of sleep is associated with up to 92% of adolescent in Saudi Arabia during summer vacation, which is high by comparison to other studies. Use electronic device before sleep, Not Drinking milk and self has a significant negative impact on the sleep quality.**

Keywords: **Effect of Summer Vacation on the Quality of Sleep, Sleep Pattern.**

1. INTRODUCTION

Sleep is a necessary condition that the body and mind requires, recurring for several hours every night, in which the nervous system is partially inactive, the eyes closed, the postural muscles relaxed, and consciousness practically suspended [1]. Throughout the world, problems of sleep among adolescents is growing, as evidenced by some studies [2] [3]. Sleep Duration, sleep quality, and daytime sleepiness where the main goals of recent studies regarding sleep problems prevalence, causes, and consequences of adolescents [4] [5].

Quality of sleep among Adolescent are affected by social, psychological, physiological, and environmental factors [6]. Adolescents exposed to many factors that may contribute to disturbed quality of sleep ,These include age, gender, Education, BMI, Having Dinner ,Vitamin B supplements, Type of summer activities ,Meting people, Have TV in bedroom, Sharing bedroom, Sleeping with light on, Sleeping in noise and Exercise last week.

Some studies notified that the Increased exposure to electronic media at late night time was associated with poor quality of sleep in terms of being disturbed or having shortened sleep duration [4] [7] [8] [9]. Other studies clarified that minimal exercise improve symptoms of chronic insomnia [10].Also, according to the reviewed studies, a balanced and varied diet can improve sleep [11].One study observed a high prevalence of short sleep duration among Saudi adolescents 15 to 19 year olds and that short sleep duration was significantly associated with increased risk of overweight and obesity. [12].

Quality of sleep studies in adolescents from Saudi Arabia are limited and there is no sufficient evidence to evaluate quality of sleep among adolescents or to know to which extent do these factors affect the quality of sleep.Thus, in this exploratory study, we aimed to estimate the Prevalence of poor quality of sleep among adolescents in Jeddah during summer vacation , to know to which extent do these factors affect the quality of sleep among Jeddah's adolescent population during summer vacation and To compare multiple factors and its effect on the sleep quality.

2. METHODS

This cross-sectional study was conducted in 2016 in Jeddah, Saudi Arabia. The number of elementary and high school students in Jeddah is 259176 (this statistic was taken from the ministry of education). The sample size was calculated based upon this statistic, and the result was 384 participants required for the study. The inclusion criteria includes all adolescent from age 10 to 18 years old in Jeddah, Saudi Arabia. Exclusion criteria includes all adolescents who have chronic disease or on drug (e.g. anti-histamine). Informed consent was obtained from the participants prior to participation in the study.

Adolescents were evaluated by online Google form distributed through social networking, between August 2016 to September 2016. The questions were divided to demographic data, questions to assess sleep quality according to Pittsburgh Sleep Quality Index (PSQI), and questions to assess each specific factor (diet, obesity, video games, TV, social life, chronic medical illness, and physical activity). The number of question for each category was as follows: 10 demographic data questions, 13 sleep quality according to Pittsburgh Sleep Quality Index (PSQI) questions, 3 diet questions, 3 physical activity questions, 2 social life questions, 2 video games and TV questions.

Quality of sleep was determined by using Sleep Quality Index (PSQI), it is an effective instrument used to measure the quality and patterns of sleep in adults population but easily understood by Adolescents. It differentiates "poor" from "good" sleep quality by measuring seven areas (components): subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month [1]. Quality of sleep was divided into 2 categories: good (A total score of < 5) and poor (A total score of 5 or greater).

Demographic/lifestyle factors were collected and analyzed as factor affecting quality of sleep. These included age, gender, Education, BMI, Having Dinner ,Vitamin B supplements, Type of summer activities, Meting people, have TV in bedroom, Sharing bedroom, Sleeping with light on, Sleeping in noise and Exercise last week.

Statistical Methods:

Statistical analysis was performed with the Statistical Package for Social Sciences version 21.0.0.0 for Windows (SPSS Inc., Chicago, IL, USA, 2012). Categorical variables are presented as frequency and percentage, while continuous variables are presented as mean Å} standard deviation (SD). Quality of sleep was classified as good (A total score of < 5); poor (A total score of 5 or greater) according to Pittsburgh Sleep Quality Index (PSQI) . Analysis of Quality of sleep associated factors was done using two categories: odds-ratios and 95%CI. A p value of <0.05 was considered to reject the null hypothesis.

3. RESULTS

3.1. The demographic characteristics of the studied group:

A total of 202 respond to the electronic questioner and the result showing that females represented 56.4% of the sample, the sample age ranged between 10 and 18 years and the educational level of the student enrolled in governmental high school represent (52.5%) of the sample. About 79% of 62 responds sleep in a dark room, 67.5% of 80 responds have TV in their bedroom and 55% of 169 responds had more than 3 social gathering in the past week. (Table 1).

Table 1. The demographic characteristics of the studied group.			
Parameter	Value	**Frequency/mean**	**Percentage/SD**
Gender		194	96.0
	Male	80	39.6
	Female	114	56.4
Education		177	87.6
	Primary	14	6.9
	Elementary	40	19.8
	High school	106	52.5
	College	17	8.4
Dinner		193	95.5
	No	8	4.0
	Heavy meal	65	32.2
	Light meal	86	42.6
	Snack	25	12.4
	Others	13	6.4
Vitamin B supplements		195	96.5
	No	168	83.2
	Yes	26	12.9
Type of summer activities		195	96.0
	No	21	10.4
	Walking	154	76.2
Meting people		197	97.5
	No	3	1.5
	Friends, family, relatives.	194	96.0
Have TV in bedroom		196	97.0
	No	99	49.0
	Yes	97	48.0
Sharing bedroom		193	95.5
	No	79	37.6
	Yes	120	59.4
Sleeping with light on (180)		180	89.1
	No	158	78.2
	Yes	38	18.8
Sleeping in noise		193	95.5
	No	155	76.7
	Yes	193	95.0
Exercise last week		38	18.8
	No	107	53.0
	Yes	86	42.6
SD: Standard deviation.			

3.2. The prevalence of sleep quality and Factors affecting quality of sleep:

Around 92% of the adolescent were found to have a PSQI global score of >5, which reflects Poor quality of sleep (Figure 1). Poor quality of sleep was significantly higher in adolescent using electronic devices before sleep (P = 0.001), not drinks milk before sleep (P = 0.001) and self assessment (P = 0.005) .(Table 2). While there is no significant association between quality of sleep and other factors such as gender, Education, Having Dinner ,Vitamin B supplements, Type of summer activities ,Meting people, Have TV in bedroom, Sharing bedroom, Sleeping with light on, Sleeping in noise and Exercise last week. (Table 3).

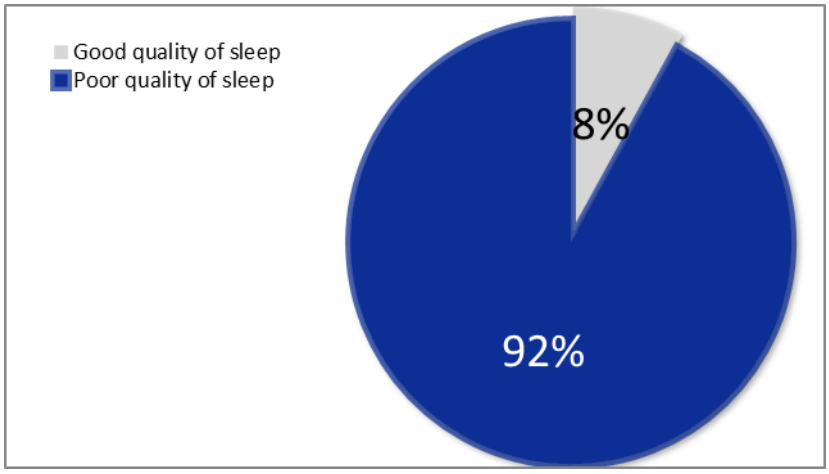

Figure 1. The prevalence of sleep quality, Poor quality of sleep represent 92% (Blue) of sample while Poor quality of sleep represent 8% (Gary)

Table 2. Significant Factors affecting the sleep pattern among adolescent

Parameter	Value	Frequency/mean	Percentage/SD	Quality of sleep			P value
				Good	Poor	Total	
Drinking milk		175	86.6				0.001
	No	161	79.7	2	51	53	
	Yes	34	16.8	3	5	8	
Use electronic device before sleep		196	97.0				0.001
	No	8	4.0	1	0	1	
	Yes	188	93.1	4	57	61	
Self assessment		196	97.0				0.005
	0	48	23.8	4	8	12	
	1	56	32.2	1	28	29	
	2	45	22.3	0	18	18	
	3	38	18.8	0	5	5	

Table 3. Non-Significant Factors affecting the sleep pattern among adolescent .

Parameter	Value	Frequency/mean	Percentage/SD	Quality of sleep			P value
				Good	Poor	Total	
Gender		194	96.0				0.867
	Male	80	39.6	2	25	27	
	Female	114	56.4	3	32	35	
Dinner		193	95.5				0.181
	Heavy meal	65	32.2	1	27	28	
	Light meal	86	42.6	4	19	23	
	Snack	25	12.4	0	10	10	
	Others	13	6.4	0	1	1	
Vitamin B supplements		195	96.5				0.349
	No	168	83.2	5	52	57	
	Yes	26	12.9	0	5	5	
Type of summer activities		195	96.0				0.742
	No	21	10.4	1	7	8	
	Walking	154	76.2	4	42	46	
Have TV in bedroom		196	97.0				0.022
	No	99	49.0	1	0	1	
	Yes	97	48.0	4	57	61	
Sharing bedroom		193	95.5				0.389
	No	79	37.6	1	22	23	
	Yes	120	59.4	4	35	39	
Sleeping with light on		180	89.1				0.956

	No	158	78.2	4	45	49	
	Yes	38	18.8	1	12	13	
Sleeping in noise		193	95.5				0.956
	No	155	76.7	4	45	49	
	Yes	193	95.0	1	12	13	
Exercise last week		38	18.8				0.284
	No	107	53.0	4	31	5	
	Yes	86	42.6	1	24	55	

4. DISCUSSION

This study investigated the sleep quality among adolescents in Saudi Arabia during summer vacation and the factors affecting these outcomes. Our main findings were that adolescent were sleep deprived and had a high prevalence of poor sleep quality (92%).

In addition, this study revealed that using electronic devices (TV, video games, tablets, etc) had a negative impact on the sleep of adolescents. This finding was also reported by a study conducted in Finland that showed a significantly shorter sleep duration and later bedtimes in adolescents using electronic devices [1].

Having a balanced diet before going to sleep and knowing what food to avoid in the evening may be beneficial in enhancing sleep. Our study results showed that there is a relation between the quality of sleep and diet, particularly milk, and there are traditional sleep-promoting food such as cow's milk and chamomile tea. In addition, vitamins B supplement promotes sleep, but it is backed by only limited clinical evidence [2-3].

According to the reviewed studies, a balanced and varied diet that is rich in fresh fruits, vegetables, whole grains, and low-fat protein sources (all of which contain plenty of TRP, as well as group B vitamins, minerals, and unrefined carbohydrates) can improve sleep [2-3].

In another study, subjects sleeping < 5 hours/day showed a significantly higher percent of carbohydrate intake ($p = 0.04$) and significantly lower percent of fat intake ($p= 0.03$) from their total daily energy intake than those sleeping > 7 hours/day. Daily energy intake decreased in relation to increasing sleeping time although this did not reach statistical significance.

Our study showed that there is no relation of quality of sleep to physical activity, which differs from international studies reporting that high levels of activity and exercise training were associated with improvements in sleep quality [4].

Electronic media have often been considered to have a negative impact on the sleep of children and adolescents. Computer use and television viewing predicted significantly shorter sleep duration and later bedtimes. In addition, playing video games prior to sleep results in sleep disturbance [1] [5].

A study was done in Kansas in 2007 reported that children experience improvement in both sleep and behavior after adenotonsillectomy [6]. In addition, a study done in 2014 in Australia showed that type 1 diabetes affected the quality of sleep resulting in sleep disruption which can explain much of the neurocognitive and behavioural deficits reported in children with type 1 diabetes [7]. Another study was done in Los Angelis in 2014 showed that children with sickle cell anemia had an affected sleep patterns due to the pain associated with their condition [8]. Also, a study in Brazil in 2015 showed that patients with uncontrolled asthma suffered of impact of the disease on activities of daily living, sleep, social activities, and normal physical exertion greater than it was among those with controlled or partially controlled asthma [9]. In our study, all adolescents who have chronic disease or on drug (e.g. anti-histamine) were excluded from the study.

During the phase of adolescence, sleep pattern begins to change and generally results in reduced amount of sleep, which may lead to sleep problems and reduction in the quality of sleep. one of the factors that cause sleep disruption is social behaviors during the adolescence years. Late-night social and other activities make it harder to fall asleep early leading to insufficient sleep and sleep debt [10]. A study conducted in the United States showed that social relational factors outperform developmental factors in determining sleep patterns [11]. Another study demonstrated the bidirectional association between sleep problem and social ties, which resulted in establishing that the better the sleep quality is, the better the social ties and vice versa [12].

The emotional impact is a major role in the psychological status of the person. It has an impact either positively or negatively on the pattern of life. Marital conflict and children's emotional insecurity can affect a fundamental aspect of

biological regulation and sleep, which consequently influences children's adjustment and academic performance. In turn, disruptions in the quality and duration of children's sleep have a negative effect on children's behavioral, emotional, and academic performance [13] [14].

5. CONCLUSION

Poor quality of sleep is associated with up to 92% of adolescent in Saudi Arabia during summer vacation, which is high by comparison to other studies. Use electronic device before sleep, Not Drinking milk and self has a significant negative impact on the sleep quality. Other factors affecting quality of sleep should be investigated in this specific population.

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