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PREVALENCE OF EXCESSIVE DAYTIME SLEEPINESS, SNORING AND PSYCHOLOGICAL DISTURBANCES AMONG ADOLESCENCE

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ABSTRACT

Introduction : Epidemiological and clinical research of sleep in adolescence has been limited but significant. Many studies suggested that sleep abnormalities could lead to depression and anxiety.

Objectives : The aim of this study is to determine the prevalence of daytime sleepiness and snoring among adolescence of college students at Mansoura University and to estimate the correlation between excessive daytime sleepiness and emotional disturbance in the context of presence or absence of snoring.

Methods : To assess excessive daytime sleepiness, we used Epworth Sleepiness Scale (ESS), for Psychological assessment we used the Mid-

dlexex Hospital Questionnaire (MHQ), to measure general emotionality e.g. free floating anxiety, phobic anxiety, obsessiveness, somatic concomitant of anxiety, depression and hysteria. Both scales had been distributed to random sample of students in three colleges at Mansoura University i.e. college of Medicine, College of arts and college of Culture and education.

Results : 144 students (53 males and 91 female) out of 395 students (36.5%) reported excessive daytime sleepiness and 84 (21.3%) of them reported snoring. Excessive daytime sleepiness showed significant correlation with free floating anxiety, phobic anxiety, somatic concomitant of anxiety, depressive traits and low significant correlation with hysterical traits.

Conclusion : Excessive daytime sleepiness and snoring appears to have a high prevalence in Egyptian college students. Adolescents identified as having sleep problems show higher rates of behavioral and emotional problems. A wide scale study needed to asses these parameters in the general public.

INTRODUCTION

Epidemiological and clinical research of sleep in adolescence has been limited but significant. The prevalence of sleep disorders and excessive daytime sleepiness in Arab world has not been identified, they are probably common but undiagnosed and unreported¹.

Wolfson and Carskadon^{2,3} have shown adolescents need 8.5-9.25 hours sleep per night. A survey of 3400 Ontario high school students in three boards, Hamilton-Wentworth, Grand-Erie and a rural board, Gibson et al⁴, showed; 47.3% of students had less than 8 hours sleep on week nights and only 20% more than the 8.5 hours recommended for adolescents. 60-70 % reported that they were often very sleepy between 8 - 10 A.M., raising concern about school start time and academic scheduling.

Under-recognized sleep-disordered breathing (SDB) in young adults may be responsible for the symptoms associated with SDB such as snoring and daytime somnolence, which are not uncommon in this age group⁵.

Adolescents identified as having sleep problems show higher rates of behavioral and emotional problems. The relationship between sleepiness and depressed mood in adolescents must be considered in both directions. That is, there is extensive evidence that adolescents with clinical mood disorders (particularly major depressive disorder) report high rates of sleep disturbances and complaints^{6,7}. There are also data indicating that adolescents with sleep problems report increased negative mood and/or difficulties with mood regulation^{8,9}. Part of the relationship may be accounted for by the effects of stress and emotional arousal interfering with sleep in adolescents with emotional problems¹⁰, whereas there is also evidence that sleep disruption can cause irritability and negative mood in adolescents¹¹.

The aim of this study is to: (1) determine the prevalence of excessive daytime sleepiness and snoring

among college students at Mansoura University, (2) correlate these abnormalities with the emotional experiences of those individuals as well as (3) clarify the comparison between snorers and non snorers in relation to their emotionality.

SUBJECTS AND METHODS

This study was conducted in the year 2005 on a sample of Mansoura University students from different colleges. They were selected by simple randomization. Epworth Sleepiness Scale (ESS) and Middlesex Hospital Questionnaire (MHQ) were applied to them after consent.

Subjects consisted of all students aged 18 to 25 years and of both sexes. Questionnaire Which included Arabic version of ESS and MHQ, were distributed to 500 students in three colleges at Mansoura University i.e. college of Medicine, College of arts and college of Culture and education. The scales were later collected between May and December 2005.

A self report question about snoring was added to Epworth Sleepiness Scale (ESS). ESS is a simple questionnaire measuring the general level of daytime sleepiness. It consists of 8

different situations and activities that are often part of everyday life. The total ESS score is a measure of the average sleep propensity and the probability of falling asleep in those conditions. The ESS score range from 0-24, with the upper limit of normal based on previous studies on healthy adults estimated to be 10¹².

Psychological study had been done by using the Arabic version of Middlesex Hospital Questionnaire¹³ to measure general emotionality e.g. free floating anxiety, phobic anxiety, obsessionality, somatic concomitant of anxiety, depression and hysteria. Each of these subset dimensions measured by 8 questions which are arranged through the test in such a fashion which is randomized for the tester, but systematic for the marker. For each question, give (2) for yes, (1) for sometimes and (0) for no. this can be applied for all questions except question number 5 and 34 where we can give (2) for no and (0) for yes. Scores above 12 will confirm neuroticism, scores between 8-12 will indicate suspicious neuroticism, while scores below 8 will indicate normality.

The total number of students who

respond was 395 of them, 256 (64.8%) between 20 to 22 years old, 115 (29.1%) between 18 to 20 years old and 24 (6.1%) between 22 to 25 years old. They were 237 (60%) females and 158 (40%) males.

A depth study was conducted on those who showed daytime sleepiness and snoring in relation to their emotionality. The data were collected and statistically analyzed using SPSS computer designed program. The level of significance was chosen at ($P < 0.05$).

RESULTS

Table (1) represents the age and sex distribution of the responder students at Mansoura University. Most of students (46.8%) were between 20 to 22 years, followed by students between 18 to 20 years and between 22 to 25 years (29.1% and 6.1%, respectively). The higher percentage of students of College of Art (26.1%) were between 18 to 20 years, while the higher percentage of students of both College of Medicine and College of Culture and Education were between 20 to 22 years i.e. 29.6% and 26.1%, respectively. The number of Females responded to questionnaires is more higher than males (60% and 40%, re-

spectively) with no significant statistical difference.

Table (2) shows the Prevalence of daytime sleepiness among Mansoura University Students. The score of 10 or more in Epworth Sleepiness Scale was recorded in 36.5% (53 males and 91) out of 395 students reported means presence daytime sleepiness. The percentage of students in College of Culture and Education recorded score of 10 or more in ESS is (17%) and it is more higher than those of College of Art and College of Medicine (13.3% and 5.8%, respectively), with mild significant statistical difference (i.e. $X^2 = 6.6$, $DF=2$ and $P < 0.05$).

Table (3) shows the Prevalence of snoring among Mansoura University Students. Snoring is present in 21.3% of students. The percentage of students in College of Art reported snoring is (11.4%) and it is more higher than those in College of Culture and Education and College of Medicine (7.6% and 2.3%, respectively), with mild significant statistical difference (i.e. $X^2 = 6.01$, $DF=2$ and $P < 0.05$).

Table (4) represents the gender difference of snoring among Mansou-

ra University Students with daytime sleepiness. Female snorers who reported daytime sleepiness are more higher than male snorers (51.2% and 33.3%, respectively), and male snorers who did not report daytime sleepiness are more higher than female snorers (10.7% and 4.8%, respectively), with mild significant statistical difference (i.e. $X^2 = 4.7$, $DF=1$ and $P<0.05$). Non-snorers females snorers who reported daytime sleepiness are more higher than non-snorers males (15.4% and 8.0%, respectively), while, non-snorers males who did not report daytime sleepiness are less higher than non-snorers females (30.9% and 47.7%, respectively), with mild significant statistical difference (i.e. $X^2 = 0.2$, $DF=1$ and $P<0.05$).

Table (5) shows the prevalence of psychological manifestations among Mansoura University Students using Middlesex Hospital Questionnaire. A high percentage of students could be considered as neurotic on obsessiveness subscale (27.8%) followed by depression and somatic concomitant of anxiety subscales (17.47% and 14.94, respectively). While, higher percentage of them reported suspect neurotic on depression scale (55.44%) followed by somatic con-

comitant of anxiety, Obsessiveness, hysteria, free floating anxiety and Phobic anxiety (43.04%, 41.3%, 40.0%, 39.1% and 34.6%, respectively).

Table (6) represents the correlation between total score of Epworth Sleepiness Scale (ESS) and Middle-Sex Hospital Questionnaire Subscales. It is clear from the table that daytime sleepiness is highly correlated with free floating anxiety, phobic anxiety, somatic concomitant of anxiety and depression subscales ($r = 0.247$, 0.211 , 0.150 and 0.307 , respectively; $P < 0.001$), but it does not correlated with obsessiveness and hysteria subscales ($r = 0.080$ and 0.073 , respectively; $P > 0.05$).

Table (7) shows the Comparison between Snorer and Non-Snorers Students according to Middle-Sex Hospital Questionnaire Responses. There is no significant statistical difference between snorers and non-snorers as regard all Middle-Sex Hospital Questionnaire subscales i.e. free floating anxiety, phobic anxiety, obsessiveness, somatic concomitant of anxiety, depression and hysteria subscales.

Table 1. Age and Sex Distribution of Responder Students

		College						Total	
		Medicine		Arts		Culture and Education			
		No.	%	No.	%	No.	%	No.	%
Age in Years	18-20	0	0.0	104	26.1	11	2.8	115	29.1
	20-22	117	29.6	36	9.1	103	26.1	256	64.8
	22-25	3	0.8	0	0.0	21	5.3	24	6.1
*Sex	Male	62	15.7	38	9.6	58	14.7	158	40.0
	Female	58	14.7	102	25.6	77	19.5	237	60.0
Total		120	30.4	140	35.2	135	34.2	395	100.0

$$* X^2 = 3.2, DF = 2, P > 0.05$$

Table 2. Prevalence of daytime sleepiness among Mansoura University Students

cut off Scores of Epworth Scale	College						Total	
	Medicine		Arts		Culture and Education			
	No.	%	No.	%	No.	%	No.	%
Equal or more than 10	23	5.8	54	13.3	67	17.0	144	36.5
Less than 10	97	24.6	86	21.8	68	17.2	251	63.5
Total	120	30.4	140	35.2	135	34.2	395	100.0

$$* X^2 = 6.6, DF = 2, P < 0.05$$

Table 3. Prevalence of Snoring among Mansoura University Students.

Snoring	College						Total	
	Medicine		Arts		Culture and Education			
	No.	%	No.	%	No.	%	No.	%
Present Absent	9	2.3	45	11.4	30	7.6	84	21.3
	111	28.1	95	23.8	105	26.6	311	78.7
Total	120	30.4	140	35.2	135	34.2	395	100.0

$$* X^2 = 6.01, DF = 2, P < 0.05$$

Table 4. Gender Difference of Snoring among Mansoura University Students with daytime sleepiness.

Epworth Scale cut off Scores	Snoring							
	Snores (84)*				Not-snores (311)**			
	Male		Female		Male		Female	
	No	%	No	%	No	%	No	%
>10	28	33.3	43	51.2	25	8.0	48	15.4
< 10	9	10.7	4	4.8	96	30.9	142	47.7
Total	37	44.0	47	56.0	121	38.9	190	61.1

* $X^2 = 4.7$, DF = 1, $P < 0.05$

** $X^2 = 0.2$, DF = 1, $P > 0.05$

Table 5. Prevalence of Psychological manifestations among Mansoura University Students using Middlesex Hospital Questionnaire

	Normal		Suspect		Patients		X^2
	No.	%	No.	%	No.	%	
Free floating anxiety	228	57.9	155	39.1	12	3.0	70.1***
Phobic anxiety	245	62.0	137	34.6	13	3.4	77.4***
Obsessionality	122	30.9	163	41.3	110	27.8	2.4
Somatic concomitant of anxiety	166	42.02	170	43.04	59	14.94	22.9***
Depression	107	27.09	219	55.44	69	17.47	35.1***
Hysteria	210	53.2	158	40.0	27	6.8	51.4***

Table 6. Correlation between Total Score of Epworth Sleepiness Scale (ESS) and Middle-Sex Hospital Questionnaire Subscales

Total Score of (ESS)		Mean	SD	r
M.S.H.Q Sub-scales	Free floating anxiety	8.07	± 3.62	
	Phobic anxiety	6.79	± 3.27	0.247***
	Obsessionality	6.51	± 2.71	0.211***
	Somatic concomitant of Anxiety	9.39	± 2.87	0.080
	Depression	7.92	± 3.43	0.150***
	Hysteria	9.14	± 2.92	0.307***
		7.25	± 2.96	0.073

** Correlation is significant at the 0.001 level (2-tailed).

Table 7. Comparison between Snorer and Non-Snorer Students according to Middle-Sex Hospital Questionnaire Responses

M.S.H.Q Sub-scales	Snorer		Non-Snorer		Total		X ² (DF= 2)
	No	%	No	%	No	%	
Free floating anxiety							1.9
- Normal	42	10.6	113	28.6	155	39.2	
- Suspect	42	10.6	186	47.2	228	57.8	
- Patients	0	00.0	12	3.00	12	3.00	
Phobic anxiety							3.9
- Normal	31	7.8	113	28.6	144	36.4	
- Suspect	48	12.3	197	49.8	245	62.1	
- Patients	5	1.3	1	0.2	6	1.5	
Obsessionality							4.6
- Normal	39	9.9	175	44.3	214	54.2	
- Suspect	20	5.1	102	25.8	122	30.9	
- Patients	25	6.3	34	8.6	59	14.9	
Somatic concomitant of Anxiety							1.6
- Normal	40	10.2	151	38.2	191	48.4	
- Suspect	30	7.6	136	34.4	166	42.0	
- Patients	14	3.5	24	6.1	38	9.6	
Depression							5.7
- Normal	65	16.5	174	44.1	239	60.6	
- Suspect	6	1.4	101	25.6	107	27.0	
- Patients	13	3.3	36	9.1	49	12.4	
Hysteria							1.6
- Normal	29	7.3	144	36.5	173	43.8	
- Suspect	50	12.7	160	40.5	210	53.2	
- Patients	5	1.3	7	1.7	12	3.0	

DISCUSSION

In this study, the Prevalence of excessive daytime sleepiness among a studied sample of Mansoura University Students was recorded in 36.5% of them. Inadequate sleep, in this percentage of students, may be due to many factors e.g. chronobiological changes of puberty, sleep disorders, co-morbid conditions, lifestyle choices and part-time work hours. As well, there are multiple factors that maximize adolescents phase-delayed bedtime behaviors, including Internet, TV, socializing with peers, and work. These should be taken into account when assessing the situation. Breslau N et al¹⁴ identified factors associated with daytime sleepiness among young adults in the general population e.g. being single and employed full time, as well as pathologic conditions such as snoring and major depression are positively associated with excessive daytime sleepiness. In addition, early school start times restrict total sleep time. Wahlstrom¹⁵ identified 50,000 students in Minnesota when their high school start times were changed from 7:15 to 8:40 A.M. in 1997-1998. Three years later, Wahlstrom¹⁵ found that average

sleep times increased by one hour. Daily attendance improved, dropout rates decreased. Students reported improved behavior and less depression. There was a slight, but not statistically significant, improvement in grades. Young T, et al¹⁶ and Olsen, LG et al¹⁷ found that daytime somnolence was reported in a large proportion of subjects without apparent SDB, suggesting that factors other than SDB may be responsible for this symptom. These factors may include sleep deprivation due to demanding study or work schedules, together with irregular sleeping patterns common in this age group¹⁸. Subjective complaints of sleepiness may not be as reliable as those reported by spouses or bed partners and do not correlate with objective measurements of sleepiness by multiple sleep latency test¹⁹.

It is clearly evident from table (4) that female college students showed snoring and daytime sleepiness more than males. This may be due to the number of females responded to questionnaires in our study is more higher than that of males (60% and 40%, respectively). These results are

contradictory with other studies i.e., in a sample from the Australian, the prevalence of EDS was found in only 10.9%²⁰ while it was 18.3% in men and 16.2% in women in a large randomized sample in United Kingdom²¹. This difference may be related to the selectivity of sample population involved in the study, and a warm climate may unmask physiological sleepiness but it does not increase daytime sleepiness by itself^{22,23}.

Regardless of the cause, inadequate sleep is associated with emotional changes where the prevalence of psychological manifestations among Mansoura University Students using Middlesex Hospital Questionnaire showed a high percentage of students could be considered as neurotic (i.e. patients) on obsessionality subscale (27.8%) followed by depression and somatic concomitant of anxiety subscales (17.47% and 14.94%, respectively) and a higher percentage of them reported suspect neurotic on depression scale (55.44%) followed by somatic concomitant of anxiety, obsessionality, hysteria, free floating anxiety and phobic anxiety (43.04%,

41.3%, 40.0%, 39.1% and 34.6%, respectively). Our results are similar to that of Moo-Estrella, J, et al²⁴, who showed students with depressive symptoms had greater number of days with somnolence during class and perceived that this affected their academic performance at a higher level than the students without symptoms. He added "in comparison to subjects without depressive symptoms, students with those symptoms rated their sleep quality as poor, perceived a greater latency to initiate sleep after going to bed and experienced a greater number of awakenings". These results were also confirmed in this study as there was high correlation between daytime sleepiness and free floating anxiety, phobic anxiety, somatic concomitant of anxiety and depression subscales, ($r = 0.247, 0.211, 0.150$ and 0.307 , respectively; $P < 0.001$), of Middlesex Hospital Questionnaire.

In our study there is positive correlation between anxiety and depression subscales with daytime sleepiness as in table (6). Anxiety and depression are manifested with insomnia. Sleepiness, perhaps the

most obvious consequence of insomnia, has posed especially thorny problems. First, even when subjective perceptions of sleepiness during the day are evaluated, analyses comparing good and poor sleepers have yielded mixed results. While some studies e.g., Fichten CS, et al²⁵, have found that people with insomnia report greater subjective sleepiness, other studies e.g., Martikainen K, et al²⁶, have failed to find significant differences between poor and normal sleepers. In addition, good and poor sleepers have generally not been found to differ on the most widely accepted objective measure of daytime sleepiness²⁷.

As previously mentioned daytime sleepiness was reported in a large proportion of students (36.5%) more than those reported with snoring (21.3%), suggesting that factors other than SDB may be responsible for these results. This agree with both Young T, et al¹⁶, and Olsen, LG et al¹⁷, who found that daytime somnolence more than appearing SDB by polysomnography. These factors may include sleep deprivation due to demanding study together with irregular

sleeping patterns common in this age group. Also, may be due to anxiety, i.e. free floating anxiety, phobic anxiety, somatic concomitant of anxiety, and depression subscales that found to be highly correlated with total Score of Epworth Sleepiness Scale (ESS).

The relationship between snoring and psychological disturbances had not been proved in this research as seen in table (7). There is no significant statistical difference between snoreres and non-snorers as regard all Middle-Sex Hospital Questionnaire subscales i.e. free floating anxiety, phobic anxiety, obsessiveness, somatic concomitant of anxiety, depression and hysteria subscales. However, snoring in the absence of SDB has been shown to be associated with daytime sleepiness and impaired performance ability²⁸. This was thought to be related to arousals and sleep fragmentation as a result of partial upper airways obstruction during sleep without the presence of frank apneas or hypopneas²⁹. Sleep fragmentation has been shown to lead to sleepiness, impaired cognition, and altered mood³⁰. Thus, snor-

ing in the absence of SDB on routine sleep study may not be "benign," but may represent a sub-clinical phase of upper airways obstruction i.e. Upper Airway Resistance Syndrome.

In our study, students in College of Culture and Education and those of College of Art recorded daytime sleepiness and snoring more than students in College of Medicine (table, 2 & 3). The prevalence of daytime sleepiness and snoring is higher in those with decreased academic achievement, impaired performance and behavioral problems. This is could be understood on the base that in our educational system the distribution students into colleges depends on their final achievement in last years of secondary schools and medical students occupy the top of secondary school achievers and both students in colleges of arts and in colleges of culture & education occupy the middle of secondary school achievers.

The results of our study support the conclusion that excessive daytime sleepiness measured by ESS appears to have a high prevalence in

Egyptian college students. Adolescents identified as having sleep problems show higher rates of behavioral and emotional problems. We recommend the following future directions:

1. Large scale study to determine the prevalence of excessive daytime sleepiness and sleep abnormalities in the general population
2. Further research is needed to determine other factors, i.e. social and biological factors, associated with daytime sleepiness among young adults in the general population.
3. Objective measures of sleep abnormalities by full night sleep are needed to confirm the results of this research.
4. Extensive studies to confirm the relationship of sleep abnormalities and psychological disturbances among young adults.

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مدى إنتشار زيادة النوم النهارى والشخير والاضطرابات النفسية بين المراهقين

إن الدراسات الانتشارية والسريرية للنوم فى المراهقين ذات دلالة إحصائية على الرغم من ندرتها. وقد أظهرت كثير من الدراسات أن اضطرابات النوم تزيد من احتمالية نشوء الاكتئاب والقلق.

والهدف من هذه الدراسة هو تقييم مدى إنتشار زيادة النوم النهارى والشخير بين المراهقين من طلبة الكليات بجامعة المنصورة ومعايرة العلاقة بين درجة النوم النهارى والاضطرابات الانفعالية لهم فى سياق وجود أو غياب الشخير.

ولإتمام هذه الدراسة استخدمنا كلا من مقياس ايبورث للنوم لتقييم زيادة النوم النهارى ومقياس مستشفى ميدل سكس لقياس درجة الانفعال العام مثل القلق العام والخوف والوساوسوالجسمنة والاكتئاب والهستيريا. وقد تم توزيع كلا من المقياسين على عينة عشوائية من طلبة ثلاث كليات بجامعة المنصورة وهم كلية الطب وكلية الآداب وكلية التربية.

وقد أظهرت النتائج أن ١٤٤ (٥٣ من الذكور و ٩١ من الإناث) من ٣٩٥ طالب بنسبة ٣٦,٥% سجلوا أنهم يعانون من زيادة النوم النهارى و ٨٤ بنسبة ٢١,٣% منهم يعانون من الشخير. وقد أظهرت الدراسة أيضاً وجود علاقة ذات دلالة إحصائية بين زيادة النوم النهارى وكل من سمات القلق العام والخوف والجسمنة والاكتئاب ولكنها بدرجة منخفضة مع سمات الهستيريا.

يبدو من ذلك أن مدى إنتشار زيادة النوم النهارى والشخير فى طلبة الكليات المصرية مرتفع ويبدو أن درجة حدوث الاضطرابات السلوكية والانفعالية فى المراهقين اللذين يعانون من اضطرابات النوم عالية.

وبهذا فمن الواضح أن هناك حاجة للقيام بدراسات إنتشاريه بدرجة أكبر لتقييم المقاييس على مستوى قومى عام.

