

Excessive Daytime Sleepiness and Its Risk Factors Among Medical Students, Medical College, University of Tabuk, Kingdom of Saudi Arabia

Amal Ibrahim Ghabban¹, Meaad Naji Almouwalled¹, Shorooq Abdulhadi Al Orabi¹, Najlaa Samran Almutairi¹, Hussam Muidh Althagafi¹, Faisal Saleh Alqhamdi¹, Abdallah Madiny Mohammed Alganmy¹, Eradah Ali Almarhoon², Wejdan Dhafer Alshehri², Lamis Majed Altoairqi², Abdullah Mohammad Altowijri³, Ahmad Jameel Makai³, Saif Mohammad Alamri³, Saeed Meshref Alshehri³, Yasin Ibrahim⁴, Hyder Osman Mirghani^{5*}

¹Medical Intern, Ministry of Health, Saudi Arabia.

²Medical Student, Ministry of Health, Saudi Arabia.

³Medical Resident, Ministry of Health, Saudi Arabia.

⁴Assistant Professor of Community Medicine, Community & Family Medicine Department, Faculty of Medicine, University of Tabuk, Tabuk, Saudi Arabia.

^{5*}Assistant Professor of Internal Medicine and Endocrine, Medical Department, Faculty of Medicine, University of Tabuk, Tabuk, Saudi Arabia.

ABSTRACT

Background: Excessive daytime sleepiness is usually attributed to laziness, but it could be a manifestation of a serious medical problem and negatively impact academic achievement. The present study assessed the daytime sleepiness and factors associated with the same among medical students.

Methods: This cross-sectional study conducted among medical students in the Medical College, University of Tabuk, Saudi Arabia during the period from February to May 2017. Two hundred and seventy-seven medical students were invited to sign a written informed consent then responded to a structured questionnaire based on the Epworth Sleepiness Scale, demographic factors, Technology use, Cumulative Academic Grade (GPA), coffee consumption and sleeping pill use. The Chi-square and t-test were used to compare the students with excessive daytime sleepiness and those without the disorder and test the associated factors. The ethical committee of the Medical College approved the research.

Results: They were 277 medical students (men 49.5%), mean age (21.78±1.59) years, excessive daytime sleepiness was evident in 52.3% of students, the average technology use/day was 5.25± 2.84 hours, the coffee intake was 1.98±1.36 cups/day, while 14.3% were using sleeping pills. No significant statistical associations were evident between the daytime

sleepiness and age, sex, technology use, sleeping pills, chronic diseases, coffee intake and the GPA, (P-value<0.05).

Conclusion: Excessive daytime sleepiness was prevalent among the medical students, the University of Tabuk, no significant differences were detected between the students with this serious sleeping disorder and those without regarding demographic factor, internet surfing, mobile phone texting, sleeping pills use, coffee consumption, and the cumulative grades.

Keywords: Excessive Daytime Sleepiness, Risk Factors, Medical Student, Saudi Arabia.

*Correspondence to:

Dr. Hyder Osman Mirghani,
Assistant Professor of Internal Medicine and Endocrine,
Medical Department, Faculty of Medicine,
University of Tabuk, Tabuk, Saudi Arabia.

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INTRODUCTION

Sleep-wake cycle, cognition, and psychomotor activities vary considerably across the circadian cycle, the circadian system promotes wakefulness and increase vigilance. The drive for sleep increase in a linear fashion over time in a cumulative manner that is not amenable to adaptation. Although there is a substantial difference between individuals, verbal processing, problem solving and creative thinking decrease substantially with chronic

or short term sleep loss. Experience from some occupations like commercial drive, military and aviation showed that complex mental operations decline by more than 60% following 72 hours of sleep loss.¹

Excessive daytime sleepiness a public health issue, is prevalent among most populations, although commonly attributed to lifestyle or laziness it had been linked to cardiovascular diseases,

depression, work error and car accidents.^{2,3} The daytime sleepiness is defined as the inability to maintain alertness and wakefulness during major waking day episodes with an unintentional and inappropriate sleep occurring almost daily for at least three months.⁴ One of the leading causes of the excessive daytime sleepiness is the use of technology and social media before bedtime, but obstructive sleep apnea and various other sleep disorders like insomnia, narcolepsy, periodic limb movement disorder, restless leg syndrome, circadian rhythm sleep disorders and hypersomnia constitute near one-third risk of sleepiness during learning activities.⁵ The ultramodern lifestyle with excessive exposure to artificial light, excessive cell phone texting, the use of social media, and surfing of the internet had dramatically changed sleep pattern with unwanted deleterious consequences like excessive daytime sleepiness and fatigue.⁶ The consumption of coffee and caffeinated drinks, central nervous system stimulants, and alcohol are other causes of excessive daytime sleepiness.^{7,8} One of the most influential theories of sleep is its role in the consolidation of recently acquired memories. Almost all studies analyzed by Rauchs et al. showed that, all four long-term memory systems (procedural memory, perceptual representation system, semantic and episodic memory, need either from non-rapid eye movement (NREM) or rapid eye movement (REM) sleep or from both sleep stages to consolidate it.^{9,10}

Excessive daytime sleepiness could lead to fatigue and substantially impair attention and hence academic achievement; The Kingdom of Saudi Arabia is a vast country with ethnic, culture and environmental diversity, furthermore different medical school use different curricula and timetables, so the studies conducted in the Western World and other region of Saudi Arabia may not apply to Tabuk. No researchers have studied the excessive daytime sleepiness among medical students in Tabuk, Saudi Arabia, thus we conducted this research to assess the daytime sleepiness and related factors among medical students, Medical College, University of Tabuk.

SUBJECTS AND METHODS

A cross-sectional study was conducted among the medical student in the Faculty of Medicine, University of Tabuk, Saudi Arabia during the period from January 2017 to February 2017. All students in the 2nd through 6th classes were targeted. Two hundred and seventy-seven out of three hundred twenty-five filled the questionnaire (response rate 85.2%).

The Epworth sleepiness scale (ESS), a well validated¹¹ self-reported questionnaire eight was used to assess excessive daytime sleepiness. The scale is an eight components choice questions that ask the subject to rate her or his probability of falling asleep or dose in eight different situations: sitting and reading, watching TV, sitting inactive in public places, as a passenger in a car for one hour without a break, lying down to rest in the afternoon when circumstances permit, sitting talking to someone, sitting quietly after a lunch without alcohol, and in a car, while stopped for a few minutes in traffic. Each question with four choices (no=zero, 1=mild, 2=moderate, and 3=severe) with an aggregate of 0-24. Students who scored \geq ten were considered excessive daytime sleepers.¹²

Orientation meetings were arranged with the participants. They were orally briefed on the purpose of the research, and how to fill the questionnaire, it was explicitly stated that their participation is entirely voluntary and that their marks will not be affected in any way. The research was conducted on days other than examinations, to avoid stress.

Information collected includes; Hours spent in the technology/day, coffee intake, using of sleep medications, chronic diseases if any, the cumulative grades (GPA) and the eight components of the Epworth sleepiness scale.

Data was analyzed by using statistical software (SPSS version 20); Chi-square and t-tests were used for testing the statistical significance and a P-value<0.05 considered significant. The ethical committee of the Faculty of Medicine, University of Tabuk approved the research.

Table 1: Distribution of factors associated with sleeping (n =277)

Characteristics	Minimum	Maximum	Mean	SD
Age	19	26	21.78	1.59
Technology use	1	20	5.25	2.84
Coffee drink	0	8	1.98	1.36
GPA	2	5	3.94	0.55

Table 2: Distribution of factors associated with sleeping (n =277)

Factor	Frequency		Percentage	
	n		%	
Gender				
Male	137		49.5	
Female	140		50.5	
Chronic diseases				
Yes	7		2.7	
No	263		97.3	
Sleeping pills				
Yes	39		14.3	
No	234		85.7	

Table 3: Distribution of excessive daytime sleepiness (n = 277)

Factors	Excessive daytime sleepiness		Total
	Yes n (%)	No n (%)	
Excessive Daytime Sleepiness	145 (52.3)	132 (47.3)	277 (100)

Table 4: Distribution of excessive daytime sleeping score (n =277)

Characteristics	Minimum	Maximum	Mean	SD
Sleeping score	1	19	9.75	3.32

Table 5: Distribution of excessive daytime sleeping time (n=277)

Characteristics	Minimum	Maximum	Mean	SD
Sitting	0	3	1.43	0.94
TV	0	3	0.87	0.89
Public places	0	3	1.25	1.0
In car	0	3	1.33	1.04
Lying	0	3	2.18	0.94
Talking	0	3	0.41	0.78
After lunch	0	3	1.88	1.06
In traffic	0	3	1.80	0.86

Table 6: Factors associated with excessive daytime sleepiness using Chi Square test(n =277)

Factor	Excessive daytime sleepiness		P-value
	Yes n (%)	No n (%)	
Gender			
Male	67 (48.9)	70 (51.1)	0.280
Female	78 (55.7)	62 (44.3)	
Chronic diseases			
Yes	5 (71.4)	2 (28.6)	0.299
No	132 (51.6)	124 (48.1)	
Sleeping pills			
Yes	19 (48.7)	20 (51.3)	0.621
No	124 (53)	110 (47)	

Table 7: Factors associated with excessive daytime sleepiness using t-test (n =277)

Factor	Excessive daytime sleepiness		P-value
	Yes Mean (SD)	No Mean (SD)	
Age	21.67 (1.57)	21.89 (1.6)	0.266
Technology use	5.57 (2.74)	4.9 (2.93)	0.052
Coffee drink	1.97 (1.42)	1.99 (1.3)	0.903
GPA	3.97 (0.56)	3.9 (0.55)	0.369

RESULTS

Out of 277 medical students, their age ranged from 19-26 years with a mean of 21.78 ± 1.59 , the time spent in the Technology use ranged from 1-20 with a mean of 5.25 ± 2.84 hours, the daily coffee intake ranged from 0-8 cups with a mean of 1.98 ± 1.36 , and their GPAs ranged from 2-5 with a mean of 3.94 ± 0.55 . (Table 1)

In the present study, nearly half of the students were females (49.5%), 2.5% of the students had chronic diseases, and 14.3% were taking sleeping pills. (Table 2) In the current data, the excessive daytime sleepiness was evident in 52.3% of medical students with a mean score of 9.75 ± 3.32 . (Tables 3,4)

The highest score of dosing or feeling sleepy was reported while lying down ($2.18 \pm 0.94/3$) followed by after Lunch (1.88 ± 1.06), in traffic (1.80 ± 0.86), and sitting and reading (1.43 ± 0.94). Table 5 illustrated the other components of Epworth Sleepiness Scale.

The current data, no significant statistical differences was found between students with and without the excessive daytime sleepiness regarding sex (48.9% among men and 55.7% among women, P -value=0.280), chronic diseases (71.4% vs. 51.6%, P -value=0.299), and the sleeping pills use (48.7% vs. 53%, P -value=0.621). (Table 6)

It is interesting to note that, no differences were concluded between the medical students with the excessive daytime sleepiness regarding age (21.67 ± 1.57 vs. 21.89 ± 1.6 , P -value=0.266), coffee consumption (1.97 ± 1.42 vs. 1.99 ± 1.3 , P -value=0.903), Technology use (5.57 ± 2.74 vs. 4.9 ± 2.93 , P -value=0.052), and GPA (3.97 ± 0.56 vs. 3.9 ± 0.55 , P -value=0.369). (Table 7)

DISCUSSION

The present study showed that the excessive daytime sleepiness was prevalent among the medical students, The University of Tabuk, no significant statistical differences was found between the students with the excessive daytime sleepiness and others without this serious sleep disorder regarding age, sex, hours spent in Technology/day, coffee intake, use of sleep medications, and chronic diseases. The current data showed that the use of Technology was higher among those with excessive daytime sleepiness. It is a well-established fact that attentiveness during class time is a significant determinant of academic achievement; excessive daytime sleepiness could lead to fatigue and substantially impair attention.⁶ The situation of excessive daytime sleepiness is alarming for the College students.

In the current study, the excessive daytime sleepiness was evident in 52.3% of medical students (even after increasing the cut-off value to ten) in similarity to Machado Duque¹³ who reported a prevalence of 49.8%. The current data was lower than a study conducted in Sudan¹⁴ and concluded a rate of 68.5%, whereas it is on the higher side when compared to the results of researchers from Malaysia¹⁵ and Japan¹⁶ (35.5% and 4.1% respectively). The differences in the results could be explained in part by the different instruments and cut-off values in different studies, which was 11 in the Malaysian study and nine in the Sudanese study, racial, cultural, and curricular difference are more plausible explanations. A recent survey conducted in King Abdulaziz, Jeddah, Saudi Arabia¹⁷ concluded the daytime sleepiness in 40% of medical students; this finding is lower than the present result, however similar to the present finding they observed no relationship between excessive daytime sleepiness and academic grades. Regular coffee intake reduces sleep through inhibition of adenosine receptors, in the current study, no statically significant association was found between excessive daytime sleepiness and coffee consumption in contradiction to the previous studies⁶ in which the coffee intake was associated with daytime sleepiness. The present findings could be explained by the small measure of coffee, other additives or not consuming it before bedtime.

The previous literature¹⁸ observed the association between internet addiction and the excessive daytime sleepiness, in the present data showed higher hours of technology use among students with excessive daytime sleepiness but not reaching

statistical significance. The discrepancy could be explained by the different objectives as the previous research studied the relationship between internet addiction and the daytime sleepiness among adolescents. A recent study¹⁹ conducted among dental students in Malaysia showed that daytime sleepiness after mobile texting late at night is a significant predictor of excessive texting. In the present study, we did not examine the texting habits.

Sleep medications use could affect the quality of sleep leading to excessive daytime sleepiness, in the present study 14.1% of medical students reported the use of sedatives in similarity to a previous study conducted among medical students and concluded that 17% of the students used medications to induce sleep.²⁰

CONCLUSION

Excessive daytime sleepiness was prevalent among medical students, Medical College, University of students, no differences were found between the students with excessive daytime sleepiness and their counterparts regarding academic grades, technology use, coffee consumption and sleeping pills intake, further multicenter studies are needed to determine the risk factors and management when appropriate. The study limitations were the fact that it was conducted at a single College, so generalization cannot be insured, and the reliance on a self-reported questionnaire is more prone to subjectivity.

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