

Medical and Law Graduates and their sleep disorders: Daytime oversleep and Risk Factors

Estudantes de Medicina e Direito e seus distúrbios do sono: sonolência excessiva diurna e fatores de risco

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Abstract

Background: The exogenous factors such as family dynamics, psychosocial stress, academic hours and lifestyle can alter the quality of sleep and affect the people's physical, occupational, cognitive and social functioning. **Objectives:** evaluate the epidemiological profile, excessive daytime sleepiness, risk factors and the quality of sleep among university students. **Method:** Cross-sectional study with 701 Medical and Law students from a private Brazilian Northeastern College. The Sociodemographic profile, Pittsburgh Sleep Quality Index and Epworth Sleepiness Scale questionnaires have been applied. The data were submitted to simple and percentage frequency as well as bivariate and multivariate analysis. Significance level: 5%. **Results:** The sample was with 659 students, 243(37%) of Medicine and 416(63%) of Law. Age group 18-24 years, predominance of females, age group 18-24 years, female 393 (60%); they self-declared being white 282 (42.7%) and brown 303 (45.9%), said they were single 604(92%) and alcohol consumers more than 60%. Poor sleep quality and sleep disturbance were found in 169(70%) medical students and 221(54%) in law ones, being statistically significant ($p < 0.001$) for the medical students. In this comparison, The Law students presented a higher risk (RR 1.34 (1.15-1.56), $p < 0.001$) for disturbance and poor sleep quality. The risk of excessive daytime sleepiness versus drug use represented 71% (RR 1.71, 95% CI 1.18-2.49) for law students. General concerns, studies, anxiety and insomnia were the most frequent risk factors. **Conclusion:** Risk factors which are part of Medical and Law students' daily routine affect their sleep quality and increase the risks of excessive daytime sleepiness.

Key words: Sleep: Students. Sleep Disorders. Excessive Drowsiness.

Resumo

Introdução: Fatores exógenos como dinâmica familiar, estresse psicossocial, horário acadêmico e estilo de vida podem alterar a qualidade do sono e repercutir no funcionamento físico, ocupacional, cognitivo e social do indivíduo. **Objetivos:** avaliar o perfil epidemiológico, a taxa de sonolência excessiva diurna, fatores de risco e a qualidade de sono entre estudantes universitários. **Método:** Estudo transversal com 659 universitários dos cursos de Medicina e Direito, de uma universidade privada do Nordeste do Brasil. Questionários sociodemográfico, Índice de Qualidade do Sono de Pittsburgh e Escala de Sonolência de Epworth foram aplicados nesse estudo. Dados submetidos à frequência simples e percentuais, análise bivariada e multivariada. Testes utilizados: Qui-quadrado de Pearson, Mann-Whitney, Mantel-Haenszel e Breslow-Day. Nível de significância 5%. **Resultados:** os 659 alunos foram inseridos na pesquisa, sendo 243(37%) de Medicina e 416 (63%) de Direito. Faixa etária 18-24 anos; predomínio do sexo feminino. Apresentaram qualidade de sono ruim e distúrbio do sono 169 (70%) estudantes de Medicina e 221(54%) de Direito, sendo estatisticamente significativo ($p < 0,001$) para os de Medicina. Quando comparados aos alunos de Direito, esses apresentaram maior risco (RR 1,34 (1,15-1,56), $p < 0,001$) para distúrbio e qualidade ruim do sono. O risco de sonolência diurna excessiva versus uso de drogas representou 71% (RR 1,71; IC95% 1,18-2,49) para os alunos de Direito. Preocupações, estudos, ansiedade e insônia foram fatores de risco mais frequentes. **Conclusão:** Fatores de risco que fazem parte do cotidiano de alunos do curso de Medicina e Direito afetam a qualidade de sono e aumentam o risco de sonolência diurna excessiva.

Palavras-chave: Sono. Estudantes. Transtornos do Sono. Transtorno da Sonolência Excessiva.

INTRODUCTION

The sleep-wake cycle is regulated by the hypothalamic systems and their functional interactions with the circadian timer control system, which, in turn, is influenced by external and internal elements, facilitating wakefulness or sleep¹. Brightness, darkness, temperature and the city sounds are external events that modulate circadian rhythm². However, other exogenous factors such as family dynamics, psychosocial stress, academic hours and lifestyle also influence the quality of sleep, and

can generate manifestations of non-repairing, fragmented sleep and symptoms resulting from sleep deprivation, such as neurasthenia, irritability, excessive daytime sleepiness, memory deficits and negative impact in motor and intellectual performance^{3,4,5}.

The daily need for sleep varies individually among people and according to the age group². Some individuals need fewer hours

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of sleep, and are called short sleepers, while others require more hours of sleep, and are known as long sleepers⁸.

Excessive Daytime Sleepiness - EDS is characterized by the inability to stay awake and alert during the main periods of wakefulness of the day, resulting in unintended sleepiness and sleep lapses. The main contributing factors are the quantity and quality of sleep are waking hours, neurological conditions (such as epilepsy), medical conditions (chronic anaemia and hypothyroidism), psychiatric conditions (depression and anxiety), psychoactive substance use and presence of primary hypersomnia⁹.

Observed in approximately 21.5% of Brazilian adults, Excessive Daytime Sleepiness is responsible for a lack of enthusiasm in daily activities, poor academic performance and exposure to potentially risky situations such as car accidents⁸. However, it may be difficult to quantify the diurnal difficulties arising from sleep loss, since patients may not be aware of the extent of sleep deprivation or are still reluctant to admit that sleepiness is a problem, attributing their difficulties to several other factors⁵.

These Medical and Law students, submitted to strong pressure and stressful situations since the very beginning of the course, in addition to the requirement of developing market competences and abilities to meet the Brazilian National Curriculum Guidelines demand, tend to reduce the amount of sleep and often desynchronize their sleep-wake cycle, forcing them to decide whether to stay awake or fulfil their sleep need^{5, 6, 10-13}.

Given that the sleep deprivation which the students undergo can lead to mental, psychological and physical deterioration, with reduced mental capacity, deficits in information retention, problem solving and interpretation of exams, it is believed that these students can compromise their quality of sleep and consequently their lives^{3,5,13,14}.

Based on this information, the present study aimed to study the profile and prevalence of sleep disorders in medical students and law students at a private university in the northeast of Brazil; to evaluate the quality of sleep and the degree of excessive daytime sleepiness of students of both courses; identify the main factors that affect their quality of sleep and compare the quality of sleep among the students from both courses.

METHODS

A cross - sectional, descriptive and comparative study was carried out at Tiradentes University, Farolândia Campus, Aracaju (SE), Brazil, with students from the Medical and Law courses from July to December / 2015. For the sample calculation the number of students enrolled in these courses was taken as reference. The medical course included a total of 400 students, enrolled from the 1st to the 6th year of the course, equivalent to 100% of the total number of students. For the law students,

the sample calculation was based on the total number of students enrolled from the first to fifth year of the course in the same period, that is, 2,000 students distributed in the morning, afternoon and evening shifts.

The sample of law students was of the probabilistic type by conglomerates, being defined the number of groupings randomly, where the conglomerates were the classrooms. It was decided to invite 80 graduate students from the 1st to the 5th years of the Law course, totalizing 400 students, sample number similar to the students of the Medicine course. A total sample of 701 students was constituted, out of whom, 99 medical students were not present at the time of the data collection. Of this total, 42 questionnaires were discarded due to inadequate filling. Therefore, the sample studied was composed of 659 students who were enrolled for the second semester of 2015.

Three self-administered questionnaires were used with open and closed questions. The sociodemographic profile had as variables: age, sex, skin color, marital status, number of children; position or function, working time, weekly workload, rest period, type of extra academic work that performs; the quality of sleep was assessed by the Pittsburgh Sleep Quality Index, which analyses the quality of sleep in relation to the last month. The sum of the maximum score of this instrument is 21 points to five points indicates poor quality in the sleep pattern, scores between 0 and 10 points indicate absence of sleepiness, between 10 and 16 points, mild drowsiness, between 16 and 20 points, moderate drowsiness, and between 20 and 24 points, severe somnolence¹⁵. The evaluation of excessive daytime sleepiness (SDE) was analyzed by the Epworth Sleepiness Scale (ESE), tested and validated for Portuguese language¹⁵. This scale accompanies instructions for punctuation of the situations inquired, such as: the chance to nap sitting, reading or watching television. Scores vary from 0 (never napping), 1 (small chance of dozing), 2 (moderate chance of dozing), and 3 (high chance of dozing)

The data were described by means of simple and percentage frequencies when categorical and mean and standard deviation when at least ordinal. Pearson's Chi-square test was used to evaluate associations between categorical variables and to verify if the scales were related. The Mann-Whitney test was used to verify the mean age, the EPWORTH score and each of the seven domains, in isolation, of the PSQI comparing the medical and law courses. Relative risks and their respective 95% confidence intervals were calculated. The Mantel-Haenszel and Breslow-Day tests were used to analyze the association between excessive daytime sleepiness (EPWORTH) and sleep disturbance (PSQI) among students of both courses, according to the period, sex and drug use, comparing relative risks. The software used was the R Core Team 2017 and the level of significance was 5%. The study was approved by the Ethics Committee of UNIT, CAAE 45299715.6.0000.5371. All students signed the Term of Free and Informed Consent.

RESULTS

A total of 659 students participated in the study, of which 243 (37%) were in Medicine and 416 (63%) in Law. The age ranged from 18 to 24 years, with a female predominance. They self-declared being white 282 (42.7%) and brown 303 (45.9%). Regarding marital status, 604 (92%) said they were single. More than 60% of the students are alcohol consumers, and law students are the largest consumers (Table 1).

By analysing each component of the PSQI in isolation, through the Mann-Whitney test, it was verified that the students of both courses judged their sleep as good in the last month, representing the subjective component of the instrument. In addition, both groups were found to take a period of 15 minutes or less to fall asleep and had a sleep efficiency of more than 85%.

Table 1. Students distribution per sociodemographic characteristics.

Sociodemographic Characteristics	Sample		Total n (%)	X ² (p-value)
	MS n (%)	LS n (%)		
	243 (37)	416 (63)		
Year of study				
1st, 2nd and 3rd year	163 (67)	163 (40)	243 (37)	3.658 (0.065)
4th, 5th and 6th years	80 (33)	240 (60)	403 (63)	
Age				
<25	183 (75)	321 (79)	504 (77)	20.5 (<0.001)
25 to 34	59 (24)	61 (15)	120 (18)	
35-44	1 (0)	20 (5)	21 (3)	
45+	0 (0)	6 (1)	6 (1)	
Gender				
Female	161 (66)	232 (56)	393 (60)	6,125 (0.016)
Male	82 (34)	179 (44)	261 (40)	
Skin Colour				
White	117 (48)	165 (40)	282 (43)	9.133 (0.044)
Black	11 (5)	33 (8)	44 (7)	
Brown	110 (45)	193 (47)	303 (46)	
Yellow	4 (2)	18 (4)	22 (3)	
Red	0 (0)	1 (0)	1 (0)	
Marital status				
Single	238 (98)	366 (88)	604 (92)	19.8 (<0.001)
Married	5 (2)	30 (7)	35 (5)	
Divorced	0 (0)	6 (1)	6 (1)	
Stable union	0 (0)	12 (3)	12 (2)	
Works				
Yes	7 (3)	195 (47)	202 (31)	140.1 (<0.001)
No	235 (97)	219 (53)	454 (69)	
Smoking				
Yes	2 (1)	23 (6)	25 (4)	9.287 (0.002)
No	240 (99)	392 (94)	632 (96)	
Previous use of tobacco				
Yes	22 (11)	(21)	97 (17)	8.488 (0.005)
No	176 (89)	284 (79)	460 (83)	
Alcohol consumption				
Yes	149 (61)	277 (67)	426 (65)	2,100 (0,151)

Sociodemographic Characteristics	Sample		Total n (%)	X ² (p-value)
	MS n (%)	LS n (%)		
	243 (37)	416 (63)		
No	94 (39)	137 (33)	231 (35)	
Previous use of alcohol				
Yes	196 (83)	357 (92)	553 (89)	11,682 (0.001)
No	40 (17)	31 (8)	71 (11)	

* Pearson X² Test; MS (Medical Students), LS (Law Students).

There was a statistical difference regarding the duration of sleep. However, no clinical significance was observed. The sleep duration of law students was around seven hours or more, while those of Medicine for 6 to 7 hours. Mean sleep dysfunction between the groups was 1.4 (SD = 0.9), $p = 0.005$

(Table 2). Analysis of the overall PSQI score showed that 169 medicine students (70%) and 221 law students (54%) had poor sleep quality. Regarding the presence of sleep disturbance, the students of both courses displayed the same percentage (9%).

Table 2. Distribution of students after isolated components of the Pittsburgh Sleep Quality Index.

Test	Sample		Total Mean (SD)	P-value
	Medical Students Mean (SD)	Law Students Mean (SD)		
Quality of Sleep	1.4 (0.7)	1.1 (0.7)	1.2 (0.7)	0,000
Sleep Latency	0.8 (0.7)	0.9 (0.8)	0.9 (0.7)	0.282
Duration of Sleep	1.4 (1)	0.8 (1)	1 (1)	0,000
Sleep Efficiency	0.1 (0.4)	0.1 (0.4)	0.1 (0.4)	0.955
Sleep Disorder	1.2 (0.6)	1.3 (0.6)	1.3 (0.6)	0.014
Use of Medications	0.2 (0.7)	0.3 (0.8)	0.3 (0.7)	0.502
Sleep Dysfunctions	1.5 (0.8)	1.3 (0.9)	1.4 (0.9)	0.005
PSQI	6.8 (2.7)	5.9 (3)	6.2 (2.9)	0,000

* Mann-Whitney test

It was observed that among the students who presented poor quality sleep or presence of sleep disorders, there was a predominance of those who were in the first half of the course, women were more prevalent in both groups, according to the

Mantel-Haenszel test. Law students, as a function of work activity had a higher risk (RR 1.34 (1.15-1.56), $p < 0.001$) of sleep disturbances and poor sleep quality when compared to students of Medicine (Table 3).

Table 3. Pittsburgh Sleep Quality Index student distribution after year of study, gender and work

PSQI: Sleep disorder/Bad	Sample				M-H	B-D
	Medical students		Law students			
	n (%)	RR (CI95%)	n (%)	RR (CI95%)		
Year of study						
1 ^o , 2 ^o and 3 ^o year	129 (68)	0,96 (0,83-1,11)	117 (47)	1,33 (1,15-1,55)	0,007	0,014
4 ^o , 5 ^o and 6 ^o year	61 (32)		130 (53)			
Gender						
Female	131 (69)	1,13 (0,97-1,32)	153 (60)	1,17 (0,99-1,36)	0,014	0,732
Male	59 (31)		101 (40)			
Working						
Yes	7 (4)	1,29 (1,21-1,38)	140 (55)	1,34 (1,15-1,56)	<0,001	0,339
No	182 (96)		116 (45)			

RR- Relative Risk; CI- Confidence interval; M-H- Mantel-Haenszel Test; B-D- Breslow Day Test.

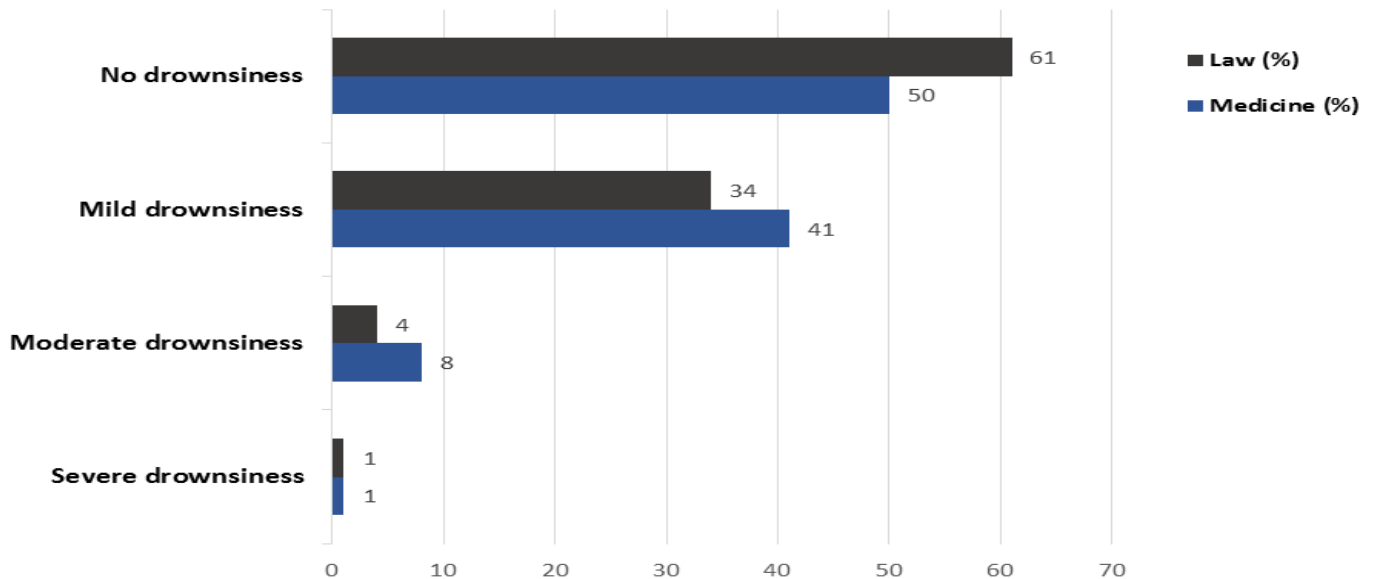
Allergy, anxiety, noise, pain, stress, studies, insomnia, personal concerns, use of cell phones were cited as factors that can affect the sleep pattern. In the studied sample, the most frequent complaints were concerns (27%), studies (20%), anxiety (19%) and insomnia (18%).

According to the Epworth Excessive Drowsiness Scale, 300 (43%) students interviewed presented some degree of excessive

daytime sleepiness at the time of data collection (Figure1).

In the Mantel-Haenszel test (MH), the degree of somnolence was predominant in females in both samples. When analysing the risk of daytime sleepiness using the Breslow-Day (BD) test, in relation to substance abuse, LS were 71% (RR 1.71, 95% CI 1.18-2.49) more likely to have some level of excessive daytime sleepiness (Table 4).

Figure 1. Sleep Quality using the Epworth Excessive Drowsiness Scale



DISCUSSION

Physiologically, sleep is a state in which there is a reduction in the ability to process environmental events. Sleep quality, as well as its disorders, has been widely studied, especially in university students, because symptoms of sleep deprivation, such as tiredness, irritability, memory deficiency and indisposition, directly affect physical, intellectual and social performance^{2, 8, 16-18}.

Most students were under 25 years old, single, with a female predominance. The students self-reported being of the white and brown skin colour in an equivalent way. Similar data have been described in the literature. Pascotto¹⁶ when analysing 136 university students in the health area in the southern region where it was noted that 112 students (80%) were female and 94 students (69.1%) were aged between 18 and 24 years. Araújo¹⁷, who assessed the quality of sleep of university students of a Brazilian north-eastern university, identified a predominance of women (62.6%) with mean age of 21.5 years. However, Cardoso⁵ in the central region of Brazil, who evaluated sleep quality in 276 medical students, noticed a predominance of males (54.7%) with students aged from 18 to 24 years old.

In relation to age, Coelho¹⁹, when analysing the quality of sleep, depression and anxiety in university students, cites where these individuals are mostly young people under²⁵, in transition between adolescence and adulthood.

The life habits data from the study revealed that students in the Law course had higher percentages of smoking compared to medical students, while alcohol consumption was equivalent in both courses, although the prevalence of alcohol intake was a little higher among the law students. There are no studies that point out the use of tobacco and alcoholic beverages among law students, as factors compromising the quality of sleep.

Machado Duke¹⁸ assessed the quality of sleep, EDS and low academic performance in medical students at the University of Bogota, from a total of 217 medical students 63.6% reported using alcohol in the last month and 17.1% smoked regularly. Despite similar values when it comes to the ingestion of alcoholic beverages, there is a divergence regarding the use of tobacco among the medical students in both the Machado-Duke¹⁸ study and in our study, which can be attributed to the socio-cultural differences.

When accessing the sleep habits, students from both courses self-evaluated their sleep as good in the last month, representing the subjective component of the instrument, i.e. individual perception of sleep quality. Similar results were suggested by Cardoso⁵ and Machado-Duke¹⁸ after analysing students from Brazil and Colombia, respectively. On the other hand, Araujo⁸, when analysing students from a public university of Brazil, and Megdal²⁰ in a North American University (Los

Angeles), both found high rates of poor sleep quality during the self-assessment of students.

This self-assessment determines an important component of human sleep pattern assessment. Therefore, the students need an efficient understanding about their sleep, since often the individual does not perceive some personal changes during the sleep, like snoring, micro awakenings and teeth grinding. It is also worth accessing the difficulty in associating certain symptoms, such as lack of enthusiasm and motivation to perform everyday activities, with the negative effects of poor sleep quality¹⁷.

The sleep hours of the law students had an overall average to that found in the adult Brazilian population (7-9 hours)⁴. The studies from Pascotto¹⁶ and Alsagga²¹ and the data obtained in our research, vindicated that the medical students have lower overall sleeping hours when compared to the adult Brazilian population. It should be remembered that the daily need for sleep varies individually and per the age group. Some individuals require more hours of sleep, known as long sleepers, while others require fewer hours of sleep being called short sleepers^{5,8,17}. From these individual differences found in the pattern of human sleep, there is no way to confirm that the average hours found in this study is sufficient, or not, to supply the homeostatic demand.

The overall PSQI analysis revealed that more than half of the studied sample had poor sleep quality with a female predominance. Of the studied groups, 70% of the MS and 54% of the LS had poor sleep quality. In 2015, a similar study²² conducted in India, analysed the sleep quality of medical students and students from other areas, the results were significantly equivalent to the present study. Furthermore, Ribeiro⁸ found similar results when compared to our study, whose poor quality of sleep numbers were overcome by the Machado-Duke¹⁸ and Araújo¹⁷ studies which identified further significant values. It is assumed that the time spent by MS in extra-curricular activities, such as tutoring, academic organizations, night shifts and scientific research, as well as the full time curricular schedule occasioned this difference in sleep quality when compared to law students^{5,18}. It was observed that law students, whose work frequency was higher than those of medicine students were, presented a higher risk of sleep disturbance and poor sleep quality.

The equivalence in the results found in both courses regarding the presence of sleep disorders itself leads one to believe that academic graduation is only one of the factors responsible for this condition, considering the individual's medical, social and emotional aspects.

After investigating the risk factors cited by the sample, which could interfere in sleep, a progression of the damage suffered by the sample was observed. Academic demand, studies, and the diverse concerns of daily life would lead the student to a state of greater anxiety, consisting of a sphere of conditions favourable to the onset of insomnia. Cardoso⁵ noticed that among the factors cited by the sample, worries and anxiety were frequent.

The data obtained in the Epworth Sleepiness Scale (ESS) vindicated that a fraction of 47% of the sample population suffered from EDS, a result that proves greater than that found in the general population (mean 21.5%)^{1,23}. Similar studies conducted in Colombia¹⁸, Saudi Arabia²¹ and Brazil^{5,8,16} showed that approximately half of the analysed students have some degree of excessive daytime sleepiness. It is inferred then, that university students have a greater propensity to EDS than the general population.

The absence of more accurate diagnostic methods (actigraphy, polysomnography, multiple sleep latency test) and the control of variables such as periods of student evaluation, personal conflicts and specific diseases were some of the limitations of the study. Marital status, financial status, family dynamics and the presence of specific diseases can be better explored and correlated with sleep quality and excessive daytime sleepiness.

CONCLUSIONS

Analysis of the PSQI global score and the Epworth Excessive Drowsiness Scale showed that in the studied groups both presented poor sleep quality and excessive daytime sleepiness. There was predominance of sleep disturbance among those who were in the first half of graduation. There was predominance of sleep disturbance among those who were in the first half of graduation. Women had a higher prevalence of poor sleep quality and the medical students had a general average of sleep lower than the Brazilian adult population. It was observed in the study group that the students were slow to fall asleep, although they had an efficient sleep. Among law students, those who used licit and illicit substances were more likely to experience excessive daytime sleepiness, and those who had extra academic activity were at increased risk of sleep disturbance and poor sleep quality. Several factors may be responsible for poor sleep quality; however, the concerns, studies, anxiety and insomnia were more prevalent. Faced with a subject so complex and little studied, new research may contribute to better elucidate the negative repercussions of poor sleep quality in the population studied.

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