

**ANALYSIS OF QUALITY
OF SLEEP, PERCEIVED
STRESS INDEX AND
QUALITY OF LIFE OF
MEDICAL ACADEMICS
DURING THE PERIOD
OF DISCIPLINARY
EVALUATION OF THE
SCHOOL SEMESTER**

Júlia Fiorante Roque

Faculdade São Leopoldo Mandic de Araras
Araras (SP)

<http://lattes.cnpq.br/4789731114610400>

Danilo Roberto Xavier de Oliveira Crege

Faculdade São Leopoldo Mandic de Araras
Araras (SP)

<http://lattes.cnpq.br/6273256621293796>

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Abstract: Sleep oscillates during the period of 24 hours in a circadian rhythm, controlled by the suprachiasmatic nucleus of the hypothalamus. There are two stages of sleep: REM and non-REM, which interfere with long-term memory consolidation, hormonal regulation, temperature and quality of life. In addition, the overload imposed on students allows the desynchronization of the sleep-wake cycle, increasing stress, with worsening academic performance. The objective of this work was to evaluate the sleep quality, quality of life and perceived stress index of students during the final period of semester assessments. Students from a Medicine course were selected during the second semester of 2020, in the week with the highest concentration of evaluations. Participants answered three questionnaires: quality of life (SF-36), Perceived Stress Index (QEP) and Pittsburgh Scale (PSQI). The SF-36 questionnaire showed improvement in functional capacity, limitation due to emotional aspects, pain and general health status, in addition to worsening in energy/fatigue, mental health and social aspects. For the perceived stress index, there were no statistically significant differences. The results of the Pittsburg Scale did not show statistically significant differences, despite the participants reporting a worsening in sleep quality.

Keywords: Quality of life, perceived stress index, sleep quality, medical students.

INTRODUCTION

Sleep is a physiological condition of the human being, which fluctuates during the period of 24 hours in circadian rhythm, according to the sleep-wake cycle.²⁰ This cycle is related to day-night alternation, controlled by the suprachiasmatic nucleus of the hypothalamus, the natural clock of the human organism.⁹

During sleep, we verified the occurrence of two phases: slow wave sleep (non-REM), predominant at the beginning of the night, and rapid eye movement sleep (REM sleep), greater during the second half of the night until the individual wakes up.⁸

In the non-REM sleep phase, there is a decrease in the production of acetylcholine, which is important for long-term memory consolidation⁹. Other functions include hormone regulation, body temperature, and maintaining quality of life.⁵ Therefore, alterations in the sleep-wake cycle lead to changes in human behavior, physical and mental health, and memory maintenance, as well as the individual's performance in daily and academic activities.¹³

Medical students, in addition to remaining in full-time curricular activities, seek better qualifications in extracurricular activities, subjecting themselves to several hours of study and sleep deprivation.⁶ Consequently, there is desynchronization of the sleep-wake cycle in an attempt to meet academic demands, with significant losses in cognition, memory, in addition to increased stress and anxiety, compromising quality of life.¹

The sleep-wake cycle also regulates cortisol release, with the cyclical variation of the circadian rhythm that occurs during REM sleep. With sleep deprivation, there is an increase in cortisol production at night, favoring stress and health problems.⁴

Chronically high concentrations of corticosteroids can affect the hippocampus, limbic system, and generate memory and attention deficits.⁴ Associated with dysregulation of the hypothalamic pituitary axis, this can lead to the development of mental illness.¹⁶

Thus, chronic stress can impair quality of life and compromise the health of individuals,⁷ with decreased productivity in daily activities, irritation, anxiety and unhappiness¹⁹.

Thus, medical students, submitted to a high workload of studies, present several risk factors for the development of irregularities in the standard cycle of wakefulness and sleep.¹⁷, in addition to chronic stress.

The aim of the study was to evaluate the sleep quality, quality of life and perceived stress index of medical students during the final period of semester assessments.

MATERIALS AND METHODS

Students from the first to the seventh period of a Medicine course were selected during the second semester of 2020, contemplating only volunteers over eighteen years of age, of both sexes.

The students were instructed to answer three questionnaires in two distinct and pre-established periods of the course. The first assessment took place in August 2020 and the second at the end of the school semester, during the week with the highest concentration of assessments for each class. The project was approved on 06/19/2020 by the Ethics Committee of the faculty where the research was carried out with CAEE: 32828720.1.0000.5374.

To assess students' perceived stress, the Perceived Stress Questionnaire (QEP) was used, in the version validated for Portuguese²¹. The questionnaire contains questions regarding thoughts and feelings that the individual has experienced, and the student must respond by indicating a frequency between 0 and 4, where 0 is never and 4 is very frequent.

Quality of life assessment was performed using the SF-36 questionnaire, while sleep quality assessment was performed using the Pittsburgh Scale Questionnaire (PSQI), whose data refer to sleep habits during the last month. It consists of 10 questions, with scores from 0 to 3 points. The maximum score is 21 points, with scores greater than 5

points indicating poor sleep quality.⁶

The collected data were analyzed using the Graph Pad Prisma software, using Student's t test when appropriate, considering statistically significant differences when $p < 0.05$.

RESULTS

Initially, 100 responses were obtained, composed of 25 students from the first semester, 23 students from the third semester, 28 from the fifth semester and 25 from the seventh semester. While in the second application, 39 responses were obtained, with 7 students from the first period, 7 from the second period, 9 from the fifth period and 16 from the seventh period.

For the analysis of the SF-36 questionnaire, considering all the classes together, there was an improvement in functional capacity, limitation due to emotional aspects, pain and general health status, in addition to worsening energy/fatigue, mental health and social aspects (Table 1).

Results of the two assessments of medical students for the Quality of Life Questionnaire. Statistical analysis of data was performed using Student's t test, considering significant differences for $p < 0.05$. * $p < 0.05$, when compared to Application 1.

Analyzing the 1st period class separately, statistically significant differences are observed in all evaluated domains, with improvement in functional capacity. At the same time, there is a reduction in the mental health index and an increase in fatigue. There is also improvement in social aspects, pain and general health status.

Results of the two evaluations of the students of the first period of the Medicine course for the Quality of Life Questionnaire. Statistical analysis of data was performed using Student's t test, considering significant differences for $p < 0.05$. * $p < 0.05$, when compared to Application 1.

	Capacity functional	Limitation by physical aspects	Limitation by emotional aspects	energy / fatigue	Mental health	Social aspects	Ache	general health status
application 1	85±0,02	62±0,03	43±0,03	54±0,05	59±0,02	60±0,02	72±0,02	61±0,02
application 2	87±0,02*	62±0,06	44±0,06*	47±0,03*	57±0,03	58±0,04*	99±0,23*	68±0,03*

Table 1-quality of life questionnaire – SF-36-all students.

	Functional capacity	Limitation by aspects	Limitation by emotional aspects	Energy/ Fatigue	Mental health	Social aspects	Ache	general health status
application 1	85±0,03	63±0,08	39±0,07	72±0,20	61±0,04	65±0,05	68±0,04	64±0,04
Application 2	86±0,07*	53±0,14*	47±0,16*	50±0,10	42±0,12*	71±0,11*	71±0,12*	68±0,03*

Table 2-Quality of Life Questionnaire-SF-36-1st period.

	Functional capacity	Limitation by physical aspects	Limitation by emotional aspects	Energy/ Fatigue	Mental health	Social aspects	Ache	General health status
application 1	79±0,05	52±0,07	45±0,07	47±0,04	57±0,04	56±0,06	75±0,04	59±0,03
application 2	91±0,03	85±0,07*	38±0,13*	49±0,08	61±0,08	64±0,11*	89±0,06*	77±0,06*

Table 3 - Quality of Life Questionnaire - SF-36-3rd period.

	Functional capacity	Limitation by physical aspects	Limitation by emotional aspects	Energia/ Fadiga	Health mental	Social aspects	Ache	Estado geral de saúde
application 1	88±0,03	57±0,07	37±0,07	51±0,03	61±0,04	57±0,04	76±0,04	64±0,03
application 2	87±0,03	61±0,14*	48±0,12*	43±0,07	56±0,07*	58±0,11*	73±0,09*	64±0,06

Table 4- Quiz Quality of life -SF-36-5º time course.

In relation to the 3rd period, there is improvement in the assessment of functional capacity, improvement in limitation due to physical aspects and worsening in relation to limitation due to emotional aspects. In addition, there is improvement in relation to: energy/fatigue, mental health, social aspects, pain and general health status.

Results of the two evaluations of the students of the third period of the Medicine course for the Quality of Life Questionnaire. Statistical analysis of data was performed using Student's t test, considering significant differences for $p < 0.05$. * $p < 0.05$, when compared to Application 1.

For the 5th period class, there was an improvement in the assessment of limitation due to physical aspects, limitation due to emotional aspects and social aspects, in addition to worsening in the assessment of energy/fatigue, mental health and pain. There were no significant differences in relation to the functional capacity and general health status domains.

Results of the two evaluations of the students of the fifth period of the Medicine course for the Quality of Life Questionnaire. Statistical analysis of data was performed using Student's t test, considering significant differences for $p < 0.05$. * $p < 0.05$, when compared to Application 1.

Analyzing the 7th period class, there was a worsening in the functional capacity domain, limitation due to physical aspects and limitation due to emotional aspects. Added to this is increased fatigue among students, worsening mental health and social aspects, with improvement in pain. There were no significant differences in general health status.

Results of the two evaluations of the students of the seventh period of the Medicine course for the Quality of Life Questionnaire. Statistical analysis of data was performed

using Student's t test, considering significant differences for $p < 0.05$. * $p < 0.05$, when compared to Application 1.

Regarding the Perceived Stress Index of students, the initial average in the first assessment was $0.41 + 0.01$, at the end of the semester the result was $0.44 + 0.02$, not showing statistically significant differences (Table 5).

When each class was compared separately, no statistically significant differences were observed either.

Results of the two assessments of medical students for the Perceived Stress Index. Values are expressed as mean + SEM. Statistical analysis of data was performed using Student's t test, considering significant differences for $p < 0.05$.

Sleep analysis showed that during the first assessment, the mean sleep quality index was $7.68 + 0.35$, while in the second assessment, this mean was $7.71 + 0.58$. The table below shows the results obtained from the average of the scores, from the PSQI scale (Table 6).

Results of the two assessments of medical students for the Pittsburgh Sleep Quality Index. Values are expressed as mean + SEM. Statistical analysis of data was performed using Student's t test, considering significant differences for $p < 0.05$.

During the qualitative analysis of sleep by the Pittsburgh Sleep Quality Index, comparing the first application (Graph 1) and second application (Graph 2), there was a proportional decrease in relation to the quality considered "good", with an increase in the levels of 'bad' sleep and 'disorders'.

DISCUSSION

In general, we verified a worsening in the quality of life of students during the semester, mainly in relation to the domains of social aspects and mental health, associated with increased fatigue. Regarding the Perceived

	Functional capacity	Limitation by physical aspects	Limitation by emotional aspects	Energy/ Fatigue	Mental health	Social aspects	Ache	General health status
application 1	87±0,02	74±0,07	50±0,08	48±0,03	58±0,03	64±0,04	70±0,04	57±0,03
application 2	85±0,06*	56±0,10*	43±0,10*	46±0,04*	56±0,03	62±0,05*	74±0,04*	65±0,03

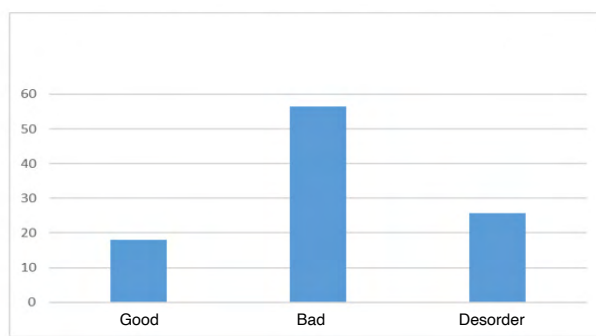
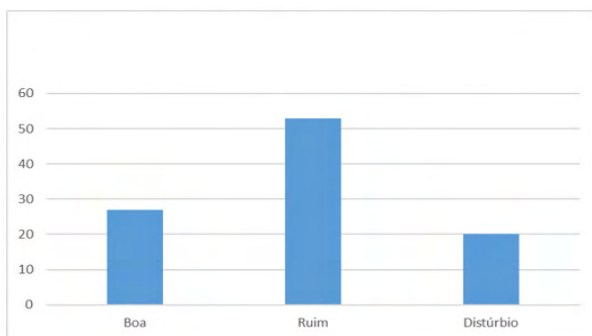
Table 4-Quality of Life Questionnaire-SF-36—7° time course.

	Rating 1	Rating 2
QEP	0,41±0,01	0,44±0,02

Table 5- Perceived Stress Index - All students.

	Rating 1	Rating 2
PSQI	7,68±0,35	7,71±0,58

Table 6 - Pittsburgh Sleep Quality Index-All Students.



Graph 1 – Qualitative sleep analysis, first application. Graph 2 – Qualitative sleep analysis, second application.

Graph 1: Qualitative sleep analysis 1st application(Qualitative sleep analysis 1st application).

Good(28) , Bad(51), disturbance (20).

Graph 2: Qualitative sleep analysis 1st application.

Good(19), Bad 58), disturbance (22).

Stress Index and Pittsburgh Sleep Quality Index, we did not obtain significant differences between the two applications performed.

We identified impairment of emotional aspects, mental health and increased fatigue among students of all classes, reflecting on quality of life. This corroborates with studies that show that the quality of life of medical students suffers predominantly in the psychological domain during the course.^{2,10,14} Likewise, it reflects the self-perception that most students consider their quality of life to be poor, both in the physical and mental domains.^{10,11,14}, consistent with the increase in fatigue and worsening of students' energy during the academic semester. Therefore, it is observed that the precarious psychological well-being and social relationships of these students accompany them throughout the course, reflecting in the worst quality of life, compared to other young people of the same age, in general.¹⁵

In addition, it is noted that 7th period students show greater impairment in other areas of the SF-36 questionnaire, in addition to psychological and increased fatigue, with worse physical performance and social aspects. This confirms that, as the medical course progresses, students experience a worsening in their quality of life, with decreases in several domains due to the wear and tear they suffer during their years of study.¹⁵

Medical training itself presents stressful factors, mainly due to the high workloads¹², and there is difficulty in reconciling social and academic life, competitiveness among students, submission to recurrent assessments and sleep deprivation¹², demonstrating that medical education promotes a stressful lifestyle and negatively affects the physical and mental health of medical students¹⁸. As a result, sleep deprivation leads to

desynchronization of the sleep-wake cycle, with impairments in cognition, increased stress and anxiety, perpetuating the impairment of reported quality of life.¹

During the study, the perceived stress index did not present significant differences during the academic semester, indicating a probable stability of this factor in the evaluated period. However, the important differences observed in the aspects of quality of life may imply a lack of self-perception of levels of stress by students, since changes observed in the domains of quality of life indicate a significant worsening of this and both factors jointly influence the lives of students. This is because it is known that there is a direct correlation between the perceived stress index and quality of life.^{3,22}

Regarding the Sleep Quality Index, the qualitative analysis showed that since the beginning of the semester, a large portion of students consider sleep "bad". In the second evaluation this increased, as well as the "sleep disturbance", and proportional decrease in relation to the quality considered "good". This can trigger reduced learning concentration and negative impacts on social activities.²⁰

Therefore, there may be an interaction between perceived stress and the quality of sleep of these students, which provides a vicious circle between these two parameters²⁰, impacting on quality of life.

CONCLUSIONS

The results obtained suggest that students from different semesters of the Medicine course present significant changes in their quality of life during the period of disciplinary assessments. In addition, the number of students who presented a sleep quality considered as poor or disturbed was also higher during this period, even with the sleep quality index not showing statistically significant differences. Despite these results,

the students' perceived stress index did not show statistically significant differences. A possible limitation in the analysis of these results is the number of participants who

responded to the second application, which was lower than in the first intervention, which may have compromised part of the statistical analysis.

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