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Sleep patterns and sleepiness of working college students

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Abstract. The double journey (work and study) may result or aggravate health problems, including sleep disturbances, as observed in previous studies with high school students. The aim of this study is to analyze the sleep-wake cycle and perceived sleepiness of working college students during weekdays. Twenty-three healthy college male students, 21-24 years old, working during the day and attending classes in the evening, participated in this study. During five consecutive days, the students filled out daily activities logs and wore actigraphs. Mean sleeping time was lower than 6 hours per night. No significant differences were observed in the sleep-wake cycle during the weekdays. The observed lack of changes in the sleep-wake cycle of these college students might occur as participants were not on a free schedule, but exposed to social constraints, as was the regular attendance to evening college and day work activities. Sleepiness worsened over the evening school hours. Those results show the burden carried by College students who perform double activities - work and study.

Key words: sleepiness, working college students, sleep-wake cycle,

1. Introduction

Young adults undergo intense physical, emotional, and cognitive development, aggravated by such factors as college admission, establishment of important relationships, independence from their parents, and the beginning of a labor life. During the past years, worries about the double journey of studying and working have been discussed [1].

The double journey (work and study) may result in or aggravate health problems, including sleep problems, as observed in previous studies with high school students [2]. Work may affect sleep and nap duration, time spent in school, and extra-curricular activities [3].

The aim of this study is to analyze the sleep-wake cycle and perceived sleepiness of working college students during the weekdays.

2. Methods

Data collection: Data were collected from August 11 to October 14, 2008. No data collection took place on weeks that included holidays.

The subjects answered a comprehensive questionnaire on living and work conditions, health symptoms and sleep. The second stage included gathering records of the sleep-wake cycle of the students using subjective methods (daily activities diaries) and objective methods (actigraphy). An actigraph (MicroMini-Motionlogger Actigraph, Ambulatory Monitoring, Inc®) was worn on the non-dominant wrist for five consecutive days. Sleepiness perception was registered three times during the evening school hours, Monday thru Friday, using the Karolinska Sleepiness Scale [4].

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Data analysis: Descriptive analysis was performed with sociodemographic data.

The sleep-wake cycle was initially submitted to descriptive analysis. It was calculated means and standard deviation for each weekday. The data were submitted to the Shapiro-Wilk normality test, and the variables displayed non-normal distribution. The Friedman test for repeated measurements (R) was used to compare the mean sleepiness levels.

3. Results

Twenty-three males, all college students who had been working for more than three months and with similar workweeks (approximately 36 to 40 hours/week) participated in this study. Consent forms were signed by all participants. Mean age was 22.2 years (SD=1.3 years); two participants were married and only one had a child. Mean monthly family income was US$ 1.730,00. Regarding body mass index (BMI): two individuals were underweight, 11 eutrophic, and 8 overweight. Regarding physical activity, ten students defined themselves as sedentary (43.5%). Two subjects were smokers, and one was a former smoker. As for the sleep-related variables, only 2 students described the place where they slept as unpleasant (8.7%).

The majority of participants entered labor force at 16 years old (74.0%). Most reported workplaces were offices (47.8%) and as trainees (65.3%). As for the length of the workday, 7 (30.4%) worked more than 8 hours/day and 16 (69.6%) from 6 to 8 hours.

No significant differences were observed in the sleep-wake cycle during the week for the variables latency, efficiency, sleep duration, daytime naps, and nocturnal awakenings. The subjects had a mean sleep latency of 7.5 min., mean efficiency of 81.5%, mean sleep duration of 5.5 hours and midsleep at 04:29. The mean napping duration was quite short: 7.9 min. and the mean nocturnal awakenings was 20.3 min. (Table 1).

We did not find statistical significant comparing sleepiness perception throughout the week, but it is significant comparing hours ($p<0.01$). Sleepiness worsened over the evening school hours. The means reported were: 4.0 at 19:00 hours, 4.5 at 20:30 hours and 22:00 hours 5.2 points. (Table 2).

4. Discussion and conclusion

The double shift (working and studying) represent important factors that may lead to dramatic changes in sleep patterns. In fact, sleep structure and duration are influenced by both internal and external factors, i.e., social and cultural circumstances [5] plus environmental, physiological, and psychological factors [6].

Table 1
Means and standard deviations for variables related to the sleep-wake cycle (SWC) in working college students during the study week.

SWC	DAYS OF THE WEEK											
	Monday		Tuesday		Wednesday		Thursday		Friday		Test	p
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Sleep latency (min)	7.6	6.9	8.5	7.1	6.4	5.6	5.6	4.0	10.4	3.6	1.88	0.76
Mid-sleep period (hrs)	04:19	01:06	04:14	01:17	03:51	00:59	04:00	01:20	05:31	01:45	1.33	0.27
Sleep duration (hrs)	05:23	01:34	06:03	01:42	05:28	01:12	05:14	02:20	05:28	02:30	0.09	0.76
Nocturnal awakenings (min)	16.1	8.7	16.9	15.7	16.6	12.7	14.7	6.1	35.4	20.6	2.83	0.59
Sleep efficiency (%)	82.5	19.4	85.8	11.6	87.5	8.1	77.6	29.7	75.1	27.4	1.46	0.83
Naps (min)	13.6	8.7	5.8	14.0	10.2	5.5	10.5	2.6	7.3	5.3	1.96	0.06

Table 2
Means and standard deviations for subjects Karolinska Sleepiness Scale, measured at 19:00h, 20:30h, and 22:00h during the study week.

KSS	DAYS OF THE WEEK									
	Monday		Tuesday		Wednesday		Thursday		Friday	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
19:00	4.2	1.4	4.1	1.3	3.9	1.6	4.5	2.1	4.0	1.2
20:30	4.8	1.2	5.1	1.3	5.0	1.7	4.9	1.9	4.9	1.1
22:00	5.6	1.2	5.3	1.3	5.2	1.2	5.1	1.5	5.4	1.3

These factors include, for example, mood, social class, family environment, seasonal and geographical differences [7]. All such factors associated with sleepiness during the working period and also during classes probably result in poorer learning (which was not investigated in this study). Acebo et al. [8] found that adolescents who fail to obtain sufficient sleep or who lack a regular sleep schedule are likely to have the highest level of school absenteeism. The observed lack of changes in the sleep-wake cycle of the college students is more likely to occur because participants were not on a free schedule, but exposed to social constraints, as was the regular attendance to evening college and day work activities.

Individuals submitted to more strict work hours and/or school schedules would tend to express rhythms of greater similarity [7]. In view of the studied groups' school/work duties during workdays, working students have to follow a stricter sleep-wake cycle.

The present data indicate that workers almost didn´t took naps during work, in class, and while commuting during the day and in the evening. According to Valencia-Flores et al. [9], a number of factors may have influenced the duration of the napping times. Probably, the working students did not have many opportunities for napping or a comfortable place to nap.

Sleepiness and fatigue are unavoidable consequences of sleep deprivation. As we observed in this study, the toll of study and work manifest in reduced sleeping times during the workdays and increased sleepiness during the school hours.

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