

RESEARCH REGARDING THE QUALITY OF SLEEP AMONG NON-SPORTIVE STUDENTS COMPARED WITH PROFESSIONAL ATHLETES

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ABSTRACT

Quality of sleep developed to be a much disputed subject in everyday life performance of men. Our study focuses on comparing two samples one of non-sportive (formed by 42 students' age 19 ± 1.22 years) and one of professional athletes (formed by 45 sportive age between 18 ± 2.01 years). The main method used for analyzing the quality of sleep between the two samples of the research was the Athlete Sleep Screening Questionnaire (ASSQ) that is a tool that analyses sleep behaviors, identify disorder in sleeping routine and determine the frequency of difficulties with sleep before and after events, competitions or intense training programs.

The results of the study showed a statistically significant differences between the two samples in the number of hours slept at night (the experiment sample having 8 to 9 hours of sleep compared with the control sample that have 6 to 7 hours); also we found differences between the time needed to fall asleep (less than 15 min at the experiment group compared with 31-60 min at the control group); less problems at sleeping in the experiment group compared with the control group and that the athletes from the experiment group are waking earlier and are a morning kind of persons compared with the control group that are more active at evening; also found differences at the caffeine doses consumed and usage of electronic devices before sleep time (the experiment have less cases compared with the control group). So the general conclusion of the study was that the level of satisfaction regarding the quality of sleep is higher at the experiment sample compared with the control sample.

KEYWORDS: sleeping quality, sport activities, sleep dysfunctions, men performance

1. Introduction

Sleep is considered a vital component for both physical and mental recovery from exercise (Robson-Ansley et al., 2009; Chase et al., 2017) and is believed to be the single best recovery strategy available to athletes (Halsen, 2008).

Sufficient amount of sleep is fundamental to growth and development as well as recovering from daily activities (Makela et al., 2016). Optimal sleep

duration among adolescent is recommended to be nine hours or more (Strasburg & Hogan, 2013).

The quality of the sleep depends on besides maintaining it for a few hours, in also producing neuro-generative activities, of vital importance for the repair and maintenance of the organism and as a consequence, to facilitate the behavior and the good performance of the diurnal activities (Sequeida & Ortiz, 2013).

Sleep and sport (Samuels, 2008) reviews have typically equated exercise-training-related sleep disturbance with sleep loss, exploring the impact of disordered sleep on athletic performance through sleep deprivation models (e.g. see Fullagar et al., 2015).

Sleep problems present in children and adolescents will have a negative impact on the development of physiological function and cognitive performance, which may affect the dynamics and quality of family life (Andreu & Arboledas, 2013).

Nearly 70 % of adolescents in 9 different countries had daily sleep duration at least eight hours, which still is short of the recommendation (Garaulet et al., 2011).

Elite athletes are rigorously selected on the basis of not only physiological but also psychological (Allen et al., 2013) attributes. It is possible that some of the personality (and relevant genetic) characteristics which militate towards success within elite sport (i.e. perfectionism and anxious concern) also predispose individuals to insomnia (e.g. see Harvey et al. 2014).

High performance team-sport athletes endure numerous physiological, psychological and neuromuscular stressors during training and competition (Nedelec et al., 2012). It is logical that these athletes balance these stressors with appropriate recovery to maximize performance and adaptation, whilst also minimizing the injury risk (Kelleman, 2010). A crucial part of this stress-recovery balance is the management of an athlete's sleep, especially during intense training and competition.

Sleep is an essential requirement for all basic human functions (Dattilo et al., 2011; Meerlo, Sgoifo, & Suchecki, 2008) and is known to affect the autonomic nervous system, endocrine system, and biochemical function when disrupted. From a psychological perspective, poor sleep also affects cognitive factors (e.g., Belenky et al., 2003) and mood states and is therefore likely to contribute to poor decision making

and motivation to train (either physically or mentally). It is estimated that more than 30 % of children and adolescents in the world present with sleep disorders, such as: insomnia, nocturnal awakenings, restless legs syndrome, somnambulism, speech during sleep, bruxism and delayed sleep phase that somehow, will affect the time spent in bed (Felden et al., 2015).

Regular participation in physical activity induces many favorable health benefits including positive adaptations of the musculoskeletal, metabolic, and cardiovascular systems (Paffenbarger et al., 1998). Sleep quantity and quality may also be improved by regular exercise. In a systematic review (21 studies; 16,549 participants in the age range 14-24 years), Lang et al. (2016) found a positive relationship (effect size: $d = 1.0$) between the amount of physical activity and sleep. However, practicing a sport at the highest level offers a different set of circumstances, including high training load (Dumortier, 2018), high individual pressure with plenty of stressors, and constraints on personal life (Schaal, 2011).

2. Objectives of the Research

Our research started from the assumption that sportive need more sleeping time to recover and have a more ordinated lifestyle compared with non-sportive students also having a better quality of sleep.

The objectives of the research were to find out the differences regarding the quality of sleep between athletes and non-sportive persons, looking for their habits regarding sleep, consumption of caffeine products over day, number of sleeping hours, the time needed to fall asleep, the usage of electronic devices before bad time, the frequency of taking medicine to fall asleep, the frequency of sleep problems and so on.

2.1. Research Sample

The research samples were formed by two groups, the first group – the experiment

group formed by 45 active athletes, 25 males and 20 females, age between 18 ± 2.01 years, that practice volleyball at CSM Bucharest, and the second group – the control group formed by 42 non-sportive

students, 22 males and 20 females, age between 19 ± 1.22 years, that are students at the “Lucian Blaga” University of Sibiu. The sample distribution can be seen in Figures no. 1 and 2:

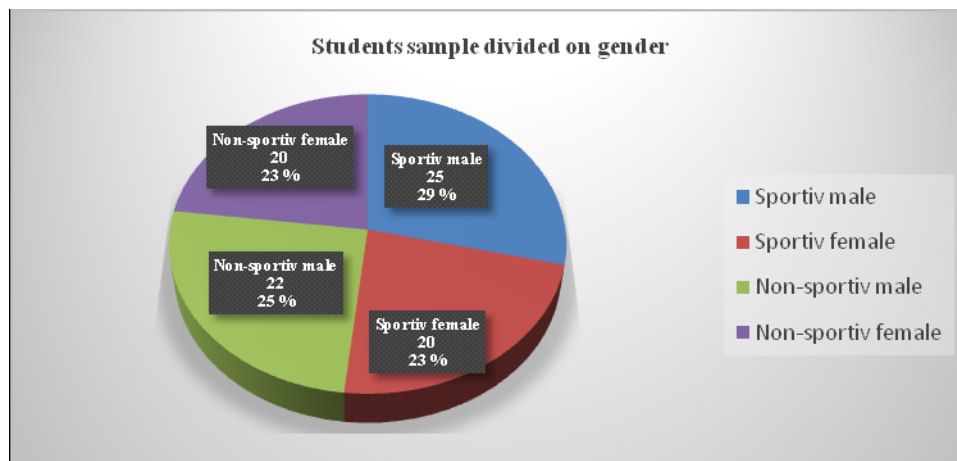


Figure no. 1: The distribution of the respondents regarding their gender

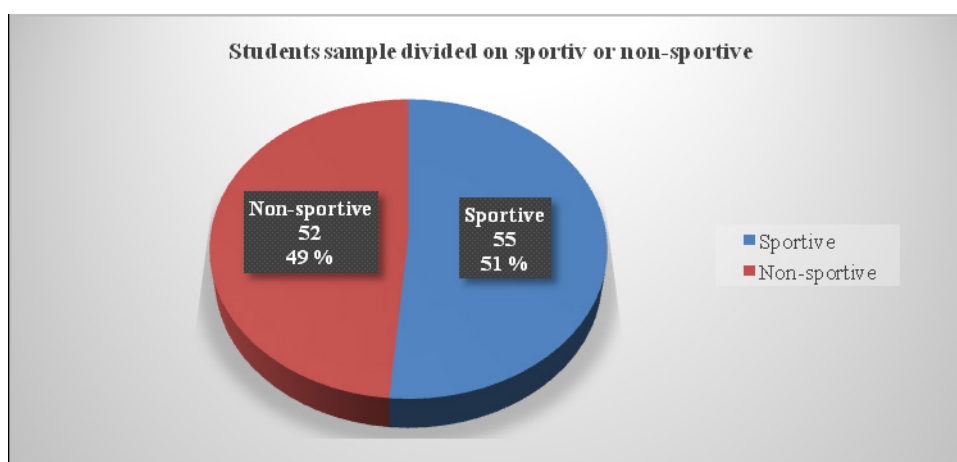


Figure no. 2: The distribution of the respondents regarding their sport experience (sportive – non-sportive)

2.2. Research Method

The main research method used in our investigation was the Athlete Sleep Screening Questionnaire (ASSQ) that is a tool that analyses athletes sleep behaviors, identify athletes with disorder in sleeping routine and determine the frequency with which athletes have difficulties with sleep before and after competitions or intense training programs. This tool was used to compare our two samples both for professional athletes and for non-sportive students from our university. The ASSQ questionnaire is composed of 16 items that

analyses the athletes sleeping routine regarding the amount of time they actually sleep, how many extra sleeps during the day they take, how much time they need to fall asleep, sleep disorders, sleep medicine, caffeine intake and sleep disturbance.

3. Results

At the first item of the Athlete Sleep Screening Questionnaire the two samples of the research were asked how many hours of actual sleep did they get at night. As we can see in Table no. 1, regarding the actual sleep at night in hours, we found no

statistical differences between gender of the experiment group with the majority of sleeping time at 8 to 9 hours or more. At the control sample we found significant differences between genders, male respondents take less sleeping hours per night.

Comparing the two samples we can observe a statistically significant differences between the two samples from where we can conclude that the experiment sample needs more time to recover and sleep more hours at night.

Table no. 1

<i>Hours of actual sleep at night</i>				
Time of actual sleep at night (hours)	The experiment sample		The control sample	
	Male	Female	Male	Female
5 to 6 hours	0	0	2	2
6 to 7 hours	4	1	7	3
7 to 8 hours	5	4	4	5
8 to 9 hours	8	8	4	4
more than 9 hours	8	7	5	6
The significance “T test” between samples	p = 0.6569 (not significant)		p = 0.7200 (significant)	
	p = 0.8581 t = 0.1846 (statistically significant difference)			

The second item of the Athlete Sleep Screening Questionnaire analyses the extra-sleep hours during daytime asking the respondents to answer how many naps per week they take. The results of the enquire can be observed in Table no. 2 showing that

at the experiment sample we found a significant difference between genders, males take more naps per week then the females. Comparing the two samples we found no statistical differences at this item.

Table no. 2

<i>Number of naps per week taken by the respondents</i>				
Number of naps per week taken	The experiment sample		The control sample	
	Male	Female	Male	Female
none	10	4	10	6
once or twice	10	9	10	12
three or four times	4	5	2	1
five to seven times	1	2	0	1
The significance “T test” between samples	p = 0.6584 (significant)		p = 0.8971 (not significant)	
	p = 0.9065 t = 0.1225 (not statistically significant difference)			

Regarding the third item of the Athlete Sleep Screening Questionnaire that refers to the level of satisfaction of the quality of respondents sleep, the two samples answered as we can see in Table no. 3. We found no statistically significant differences between genders

neither at the experiment group or the control group, but we found significant differences between the two samples showing that the level of satisfaction regarding the quality of sleep is higher at the experiment sample compared with the control sample.

Table no. 3

<i>The level of satisfaction regarding the quality of sleep</i>				
Time of actual sleep at night (hours)	The experiment sample		The control sample	
	Male	Female	Male	Female
very satisfied	15	13	5	6
somewhat satisfied	7	6	10	8
neither satisfied nor dissatisfied	2	1	3	3
somewhat dissatisfied	1	0	2	1
very dissatisfied	0	0	2	1
The significance	p = 0.7960 (not significant)		p = 0.7771 (not significant)	
“T test” between samples	p = 0.8973 t = 0.1333 (statistically significant)			

At the 4rd item of the questionnaire we investigated “how long it takes usually to fall asleep each night” for the respondents in our two groups. As can be observed in Table no. 4 we found no statistically significant differences between

genders in both groups but we found significant differences between the experiment group and the control group, the experiment group need less time to fall asleep compared with the control group.

Table no. 4

<i>How long it takes usually to fall asleep each night</i>				
Time needed for falling asleep	The experiment sample		The control sample	
	Male	Female	Male	Female
15 min or less	16	14	5	4
16 – 30 min	7	5	4	6
31 – 60 min	2	1	10	8
longer than 60 min	0	0	3	2
The significance “T test” between samples	p = 0.8026 (not significant) p = 0.9213 t = 0.1030 (statistically significant difference)		p = 0.8128 (not significant)	

The 5th item of the questionnaire analyzed how often the respondents have trouble staying asleep. The results as can be seen in Table no. 5 showed that at the experiment group we have significant

differences between males and females and also significant statistical differences we can observe between the experiment and control sample.

Table no. 5

<i>The frequency of trouble to sleep</i>				
The frequency of trouble to sleep	The experiment sample		The control sample	
	Male	Female	Male	Female
None	18	15	10	8
Once or twice per week	7	4	7	8
Three or four times per week	0	1	4	3
Five to seven days per week	0	0	1	1
The significance “T test” between samples	p = 0.8268 (significant) p = 0.9325 t = 0.0883 (statistically significant)		p = 0.855 (not significant)	

Regarding the 6th item of our questionnaire that analyzed the frequency of taking medicine to fall asleep (Table no. 6) we found no statistical differences between genders of both groups and neither between

the experiment sample and the control sample. The majority of both group respondents doesn’t take pills to fall asleep, few cases take once or twice per week and very few take three or four times per week.

Table no. 6

<i>The frequency of taking medicine to fall asleep</i>				
The frequency of taking medicine to fall asleep	The experiment sample		The control sample	
	Male	Female	Male	Female
None	22	19	17	15
Once or twice per week	3	1	4	3
Three or four times per week	0	0	1	2
Five to seven days per week	0	0	0	0
The significance “T test” between samples	p = 0.8654 (not significant) p = 0.9536 t = 0.0607 (not statistically significant)		p = 0.9264 (not significant)	

Regarding the 7th item of the questionnaire, that analyzed at what time

our respondents would get up if they were entirely free to plan their day, we can

observe in Table no. 7 that were discovered significant statistically differences between genders of the experiment group and also significant differences between the experiment group and the control group.

As we can see at the experiment group the interval most choose was 6:30 AM – 7:45 AM compared with the control group which choose the next interval between 7:45 AM – 9:45 AM.

Table no. 7

<i>At what time would you get up if you were entirely free to plan your day</i>				
The “feeling best” rhythm awake our	The experiment sample		The control sample	
	Male	Female	Male	Female
5:00 AM – 6:30 AM	0	0	0	0
6:30 AM – 7:45 AM	15	14	2	3
7:45 AM – 9:45 AM	7	2	10	11
9:45 AM – 11:00 AM	2	3	6	4
11:00 AM – 12:00 PM	1	1	4	2
The significance “T test” between samples	p = 0.7974 (significant) p = 0.9265 t = 0.0952 (statistically significant)		p = 0.8788 (not significant)	

At the 8th item of the questionnaire regarding the alert feeling at the first half-hour after the awakening we found significant differences between genders in both groups and also statistically significant differences between the experiment group and the control group. As we can analyze

the results we can conclude that at the experiment group the interval between 5:00 AM – 6:30 AM and 6:30 AM to 7:45 AM is more likely to be the period where the athletes are more alert compared with the control group which choose the 7:45 AM – 9:45 AM interval.

Table no. 8

<i>How alert do you feel during the first half-hour after having awakened</i>				
Feeling alert after awakening	The experiment sample		The control sample	
	Male	Female	Male	Female
5:00 AM – 6:30 AM	10	10	2	3
6:30 AM – 7:45 AM	11	8	8	10
7:45 AM – 9:45 AM	4	2	11	6
9:45 AM – 11:00 AM	0	0	1	1
11:00 AM – 12:00 PM	0	0	0	0
The significance “T test” between samples	p = 0.7599 (significant) p = 0.9463 t = 0.0695 (statistically significant)		p = 0.8908 (significant)	

The results at the 9th item of the questionnaire (Table no. 9) that had as subject of enquire the type of persons morning kind or evening type of person we found significant differences between genders of the control group and also

between the experiment group and the control group showing that the respondents from the experiment group are more kind of morning type compared with the control group that are more likely to be an evening type of persons.

Table no. 9

<i>Morning kind of person or an evening type person</i>				
Morning or evening kind of person	The experiment sample		The control sample	
	Male	Female	Male	Female
Definitely a morning type	11	8	2	3
More a morning type than an evening type	6	6	6	3
More an evening type than a morning type	4	4	5	8
Definitely an evening type	4	2	9	6
The significance “T test” between samples	p = 0.5728 (not significant) p = 0.8430 t = 0.2069 (statistically significant)		p = 0.8005 (significant)	

At the item no. 10 of the questionnaire the respondents were asked at what time would they go to bed if they were entirely free to plan their evening. We found significant statistically differences between the two groups of our investigation, the majority of the

respondents choose the 10:15 PM – 12:30 AM interval compared with the control sample where the respondents choose the 12:30 AM – 1:45 AM as the proper interval of sleep. No significant gender differences were found in both groups of research.

Table no. 10

<i>At what time would you go to bed if you were entirely free to plan your evening?</i>				
Time to go to bad	The experiment sample		The control sample	
	Male	Female	Male	Female
8:00 PM – 9:00 PM	0	0	0	0
9:00 PM – 10:15 PM	1	2	0	0
10:15 PM – 12:30 AM	22	17	4	6
12:30 AM – 1:45 AM	2	1	15	13
1:45 AM – 3:00 PM	0	0	3	1
The significance	p = 0.8571 (not significant)		p = 0.9174 (not significant)	
“T test” between samples	p = 0.9494 t = 0.0654 (statistically significant)			

At the 11th item of the questionnaire we investigated the frequency of sleep disturbance at the sportive and non-sportive respondents before an important event. As we can analyze the graphics from Figure no. 3 the sportive respondents encounter fewer episodes of sleep disorder then the non-sportive (11 respondents at the

experiment group compared with 19 cases at the control group) and also we can see that in the experiment group we encounter more respondents that don't experience sleep disorder before competition compared with the control group (44 respondents at the experiment group compared with 33 cases at the control group).

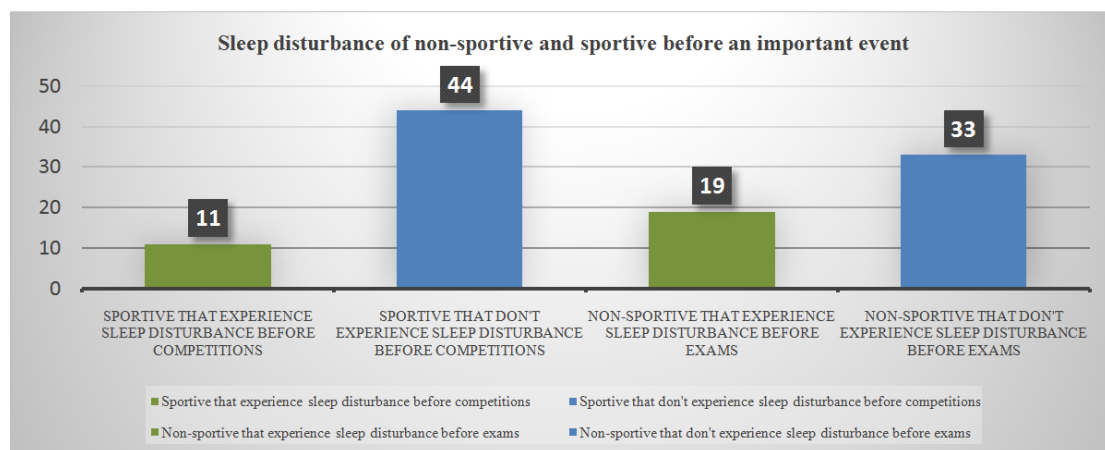


Figure no. 3: Before an important event (exam for non-sportive and competition for sportive respondents) do you experience sleep disturbance?

Regarding the 12th item of the questionnaire we investigated the snoring sleep disorder of our respondents at the experiment and control group. As we can see in Figure no. 4 we encounter more snoring sleep disorder at the control group (11 cases)

compared with the experiment group (8 cases). Regarding the non-snoring loud sleep disorder we encounter more cases at the experiment group (47 respondents) compared with the control group (41 respondents).

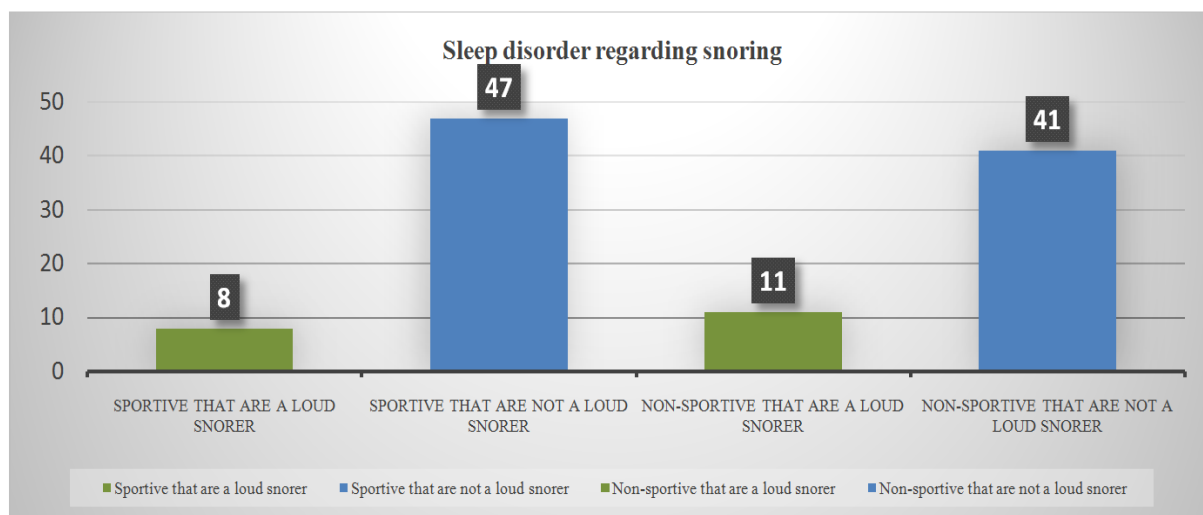


Figure no. 4: Sleep disturbance regarding loud snoring?

At the 13th item of the questionnaire we enquire about daytime dysfunction when travelling, as we can observe in Figure no. 5 we had more cases in the control group with non-sportive respondents (11 cases) compared with the

experiment group (8 cases). As for the respondents that doesn't experience sleep disorder we encounter more cases in the experience group (50 respondents) compared with the control group (41 respondents).

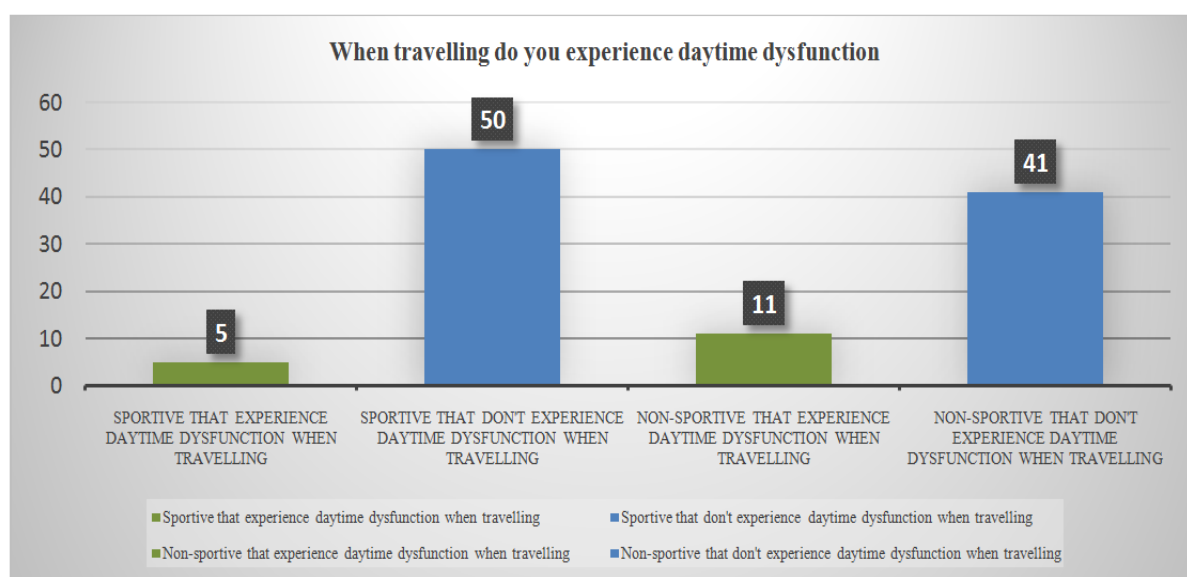


Figure no. 5: Daytime dysfunction when travelling

At the 14th item of the questionnaire (Figure no. 6) we investigated the sleep disorder regarding choking, gasping or stop breathing in sleep time, we found out that in the control group we have more cases of this kind of sleep disorder (8 respondents)

compared with the experiment group (3 respondents), also respondents that don't encounter this kind of sleep disorder are more frequent in the experiment group (52 cases) compared with the control group (44 cases).

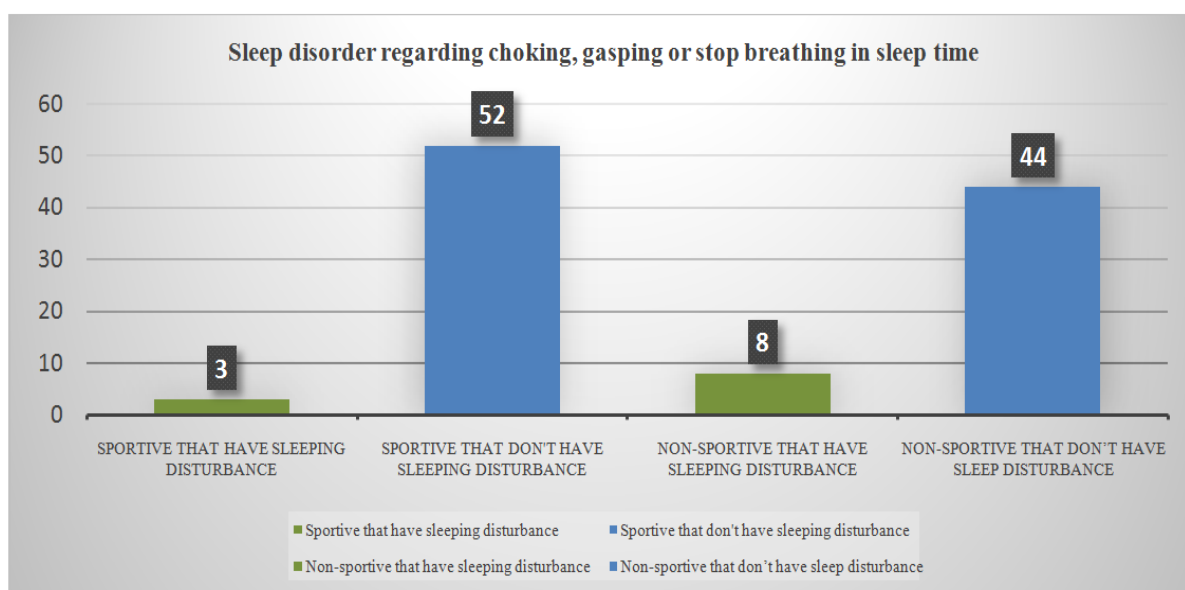


Figure no. 6: Sleep disorder regarding choking, gasping or stop breathing in sleep time

At the 15th item of the Athlete Sleep Screening Questionnaire we analyze the number of doze of caffeinated products that our respondents have per day. As we can observe we found no statistically significant differences between gender in both groups but we found statistically significant differences between the experiment group compared with the control group.

At the experiment group the majority of the respondents take one or less doze of caffeinated products per day compared with the control group where the majority of the respondents take 1 or 2 doze. Also we find more cases of 3-4 or even 5 doze at the control group compared with none in the experiment group.

Table no. 11

How many doze of caffeinated products (caffeine pills, coffee, tea, soda, energy drinks) do you have per day?

coffee, tea, soda, energy drinks) do you have per day?				
Number of caffeine doze per day	The experiment sample		The control sample	
	Male	Female	Male	Female
Less than 1 per day	21	17	5	2
1-2 per day	4	3	10	11
3 per day	0	0	5	5
4 per day	0	0	2	2
5 or more per day	0	0	0	0
The significance "T test" between samples	p = 0.8535 (not significant)		p = 0.8798 (not significant)	
	p = 0.9434 t = 0.0733 (statistically significant)			

At the last item, item no. 16, we can observe in Table no. 12 that analyzed how often the respondents use an electronic device within 1 hour of going to bed. At the experiment group we found no significant difference between genders but we found statistically significant difference between

the experiment group compared with the control group. As we can observe at the experiment group the respondents use for 1-3 times a week electronic devices before bad time compared with the control group that use 4-6 times or even every day electronic devices before sleep.

Table no. 12

*Over the recent past, how often do you use an electronic device
(example: cell phone, computer, tablet, T.V. etc.) within 1 hour of going to bed?*

Usage of electronic device before bad time	The experiment sample		The control sample	
	Male	Female	Male	Female
Not at all	3	5	4	2
1-3 per week	17	13	5	2
4-6 per week	4	1	8	7
Every day	1	1	5	9
The significance "T test" between samples	p = 0.7953 (not significant) p = 0.9446 t = 0.0725 (statistically significant)		p = 0.8090 (significant)	

4. Discussions

Our research aimed to identify the differences of quality sleep between sportive and non-sportive with the help of Athlete Sleep Screening Questionnaire. We found statistically significant differences between the two groups regarding the quantity of sleep so at the experiment group, where we had only sportive, the quantity of sleep is better the respondents sleep between 8-9 hours at night compared with the control group where they sleep 7-8 hours. Other research indicates that in addition to sleep disorders, most adolescents sleep around 7 hours a night, approximately one hour less than their estimated need for sleep (Matricciani et al., 2012). This reduction in sleep would be linked to increased social demands, insertion in the work world, school activities, hormonal changes that alter the circadian rhythm and an excessive use of electronic equipment (Calamaro et al., 2009).

Also other significant findings were found at the level of satisfaction regarding sleep at night, the majority of the respondents from the experiment group answering that they are very satisfied with the quality of sleep compared with the control group where the majority of the respondents affirm that they are somewhat satisfied.

Another study found that about 40% of adolescents who have short sleep, have reported waking up tired, this fatigue causes increased daytime sleepiness, which would

be a consequence of sleep deprivation due to school hours and may influence cognitive performance (Knutson, 2005).

The results of another study showed that the results were not statistically significant, although the two groups in the research had high prevalence rates for sleeping 8 hours or more per night at the weekend, these prevalence dropped considerably during the week. Practically three quarters of the two groups sleep between 6 and 8 hours, or less than 6 hours a night, during the week (Ferreira-Lima, 2018).

Also we found statistically significant differences between the time needed to fall asleep (less than 15 min at the experiment group compared with 31-60 min at the control group); less problems at sleeping in the experiment group compared with the control group and that the athletes from the experiment group are waking earlier and are a morning kind of persons compared with the control group that are more active at evening. Also we found differences at the caffeine doses consumed and usage of electronic devices before sleep time (the experiment have less cases compared with the control group).

So the general conclusion of the study was that the level of satisfaction regarding the quality of sleep is higher at the experiment sample compared with the control sample.

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