



Science, Movement and Health, Vol. XVI, ISSUE 2 Supplement, 2016  
September 2016, 16 (2, Supplement): 668-673  
*Original article*

## THE PITTSBURGH SLEEP QUALITY INDEX - A MEAN OF SLEEP ASSESSING

SABAU Elena<sup>1</sup>, NICULESCU Georgeta<sup>1</sup>, GEVAT Cecilia<sup>2</sup>

### Abstract\*

*Aim* of the study is that assesses sleep quality of a group of students. Hypothesis: the young people do not have a good score of sleep quality.

*The method* Pittsburgh Sleep Quality Index (PSQI) is a self-report questionnaire that assesses sleep quality. The questionnaire has seven "component" scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The subjects were 70 healthy, young people (males / females, active / sedentary), with ages between 21 and 34. The results were statistically processed.

*Results* The data provided by the global score of the survey, show that young males have a lower score (< 5), that means a good quality of recovery. The young females have a higher global score (> 5) that means a lower sleep quality. The hypothesis was partially confirmed.

*Conclusions* Sleep is a psychophysiological behavior that interests both males and females. It seems that males can manage better the sleep, than females.

*Key words:* sleep, recovery, young people, PSQI

### Introduction

Recovery's target is the equilibrium and functional parameters of the internal environment. Sleep is the best mean of recovery for all the people, athletes or non athletes. Sleep affects the entire body. Sleep is very important behavioral condition that affects people's life. People can not live without sleep. Human performances dependent on biological rhythms, namely the sleep-wake rhythm.

Sleep is a naturally recurring state of mind. Sleep is a physiological state alternating with wakefulness. Sleep has an important role in on physical and intellectual capacity; deep and restful sleep and is characterized by fast and deep asleep (Ionescu and Anton, 2004). The mechanisms of sleep are the subject of substantial ongoing research. Sleep is divided into two broad types: rapid eye movement (REM sleep) and non-rapid eye movement (non-REM sleep). Each type of sleep has different physiological and neurological characteristics. Sleep proceeds in the two cycles in NREM and REM order in four or five of them per sleep.

Sleep timing is controlled by the circadian clock. The circadian clock measures the time of day based on input from outside light signals. This inner timekeeper acts even if the outside signals disappear. The circadian rhythm influences the timing of a restorative sleep episode. Scientists are providing information regarding

human sleep. As the duration and timing of sleep are tightly regulated, it is assumed that sleep provides a number of important psychological and physiological functions (Beersma, 1998). During a night's sleep, a small period of time is spent in a waking state. It seems that young adults are awake more than females, usually in later cycles, shortly after REM sleep.

People may suffer from a number of sleep disorders. Sleep deficiency can affect people even when they sleep the total number of hours recommended. Bad sleep habits and sleep loss will affect health. Sleep deficiency is linked to an increased risk of heart disease, kidney disease, high blood pressure, obesity, diabetes and other diseases. Sleep supports growth and development. Deep sleep helps the body to release the hormone that promotes normal growth in children and teens. This hormone boosts muscle mass and helps repair cells and tissues in children, teens, and adults. All the behaviors that improve the amount and quality of sleep mean good sleep hygiene. It is generally regarded that poor sleep hygiene is not the primary cause of insomnia, although it may contribute to it (Halson, 2008).

### Methods

The study assesses sleep quality of a group of students. Hypothesis: the young people do not have a good score of sleep quality. The purpose The Pittsburgh Sleep Quality Index (PSQI) was developed

<sup>1</sup> Spiru Haret University, Berceni Avenue no. 24, 41017 Bucharest, ROMANIA

<sup>2</sup> Ovidius University, Serbanescu A. Street no.1, 90470 Constanta, ROMANIA

E-mail address: elenasabau20@yahoo.com

Received 22.02.2016 / Accepted 19.03.2016

\* the abstract was published in the 16<sup>th</sup> I.S.C. "Perspectives in Physical Education and Sport" - Ovidius University of Constanta, May 20-21, 2016, Romania



by Dr. Daniel J. Buysse and coworkers at the University of Pittsburgh's Western Psychiatric Institute and Clinic (Buysse, 1989). Mollayeva et al. (2015) underline that "the Pittsburgh Sleep Quality Index (PSQI) is currently the only standardized clinical instrument that covers a broad range of indicators relevant to sleep quality PSQI is an effective instrument used to measure the quality and patterns of sleep in adults". This test differentiates sleep by measuring seven components as: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping

medications, and daytime dysfunction over the last month. A total score of "5" or greater is indicative of poor sleep quality and a total score of 5 or more needs a visit to a healthcare provider.

**Results**

**Q<sub>1</sub>** During the past month, when have you usually gone to bed at night? The usual bed time is 23.00 for females and 22.00 for males. It seems that males go to bed earlier than females (Table 1). The subjects sleep time is from one or two hours before midnight. This is a good attitude of sleep time.

Table 1 Bed time	
Males	22.00
Females	23.00

**Q<sub>2</sub>** During the past month, how long has it usually take you to fall asleep each night? The length of time between going to bed and falling asleep is between 31 and 60 minutes for females. For males the length of this time is 15 minutes or less. The males fall asleep

faster than females (Table 2). It seems that it takes the average human about 15 minutes to fall asleep. The females need more than 15 minutes to fall asleep. The males sleep latency is better than females.

Table 2 Sleep latency	
Males	≤ 15 minutes
Females	31-60 minutes

**Q<sub>3</sub>** During the past month, when have you usually gotten up in the morning? Both genders usually get up

in the morning about 6.00 o'clock (Table 3). Six o'clock is a good wake up timing for the subjects.

Table 3 Getting up time	
Males	6.00 o'clock
Females	6.00 o'clock

**Q<sub>4</sub>** During the past month, how many hours of actual sleep did you get at night? The amount of sleep is 8 hours for males and 7 hours for females (Table 4).

Males have a longer sleep than females. We notice they go to bed an hour earlier than females.

Table 4 Sleep duration	
Males	8 hours
Females	7 hours

**Q<sub>5</sub>** During the past month, how often have you had troubled sleep because some mater. Males cannot get to sleep within 30 minutes less that once a week, but for females that happened once or twice a week. The females wake up in the middle of the night or early morning less than once a week, but the males never do this. The frequency of getting up to use up the bathroom is less than once on a week for males and not during last week. All the subjects have a good breathe during the sleep, and the sleep is not disturbance by breath problems. Females sleep was not disturbed by

caught or snore loudly last week, but males had less than once a week this problem. Males had no problem caused by feeling cold or hot during their sleep last week. Females sleep was disturbed less than once a week by feeling cold or hot. Females had bad dreams three or more times a week, but males had no bad dreams during last week. Females sleep was not disturbed by any pain last week, but males sleep was interrupted by pain one or twice a week. Both of gender's sleep was affected by other reasons less than once a week (Table 5).



Table 5 Sleep dysfunction	Not last week	Less than once a week	Once or twice a week	Two or more times a week
Wake up in the middle of the night/early morning		M	F	
Get up to use up bathroom	M	F		
Cannot breathe comfortably	F	M		
Caught or snore loudly	M/F			
Feel too cold	M	F		
Feel too hot	M	F		
Have bad dreams	M			F
Have pain	M		F	
Other reasons		M/F		

**Q<sub>6</sub>** During the past month, how would you rate your sleep quality overall? Males and females had a fairly good sleep last week (Table 6). The amount of seven or

eight hours of sleep is enough to appreciate the sleep us fairly good.

Table 6 Subjective Sleep quality	
Males	Fairly good
Females	Fairly good

**Q<sub>7</sub>** During the past month, how often have you taken medicine to help your sleep? No one used medicines to help their sleep during last week (Table 7). It is a good

sleep behavior underlined by the fact that the subjects did not use sleep medication.

Table 7 Sleep medication	Not last week	Less than once a week	Once or twice a week	Two or more times a week
During the past month, how often have you taken medicine to help your sleep?	M/F			

**Q<sub>8</sub>** During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activities? Males and females had no

trouble staying awake during daily activities (Table 8). The subject's sleep seems to be healthy and they had no daytime dysfunction during last week.

Table 8 Daytime dysfunction	Not last week	Less than once a week	Once or twice a week	Two or more times a week
During the past month, how often have you had trouble staying awake in activities?	M/F			

**Q<sub>9</sub>** During the past month, how much you keep up enough enthusiasm to get things done? The subjects had no problem to be active and do anything (Table 9). The subjects can be fresh and enthusiasm in their daytime after each sleep night last week.

Table 9 Dailly active	No problem	Only a very slight problem	Some what of a problem	A very big problem
During the past month, how much you keep up enough enthusiasm to get things done?	M/F			



## Discussion

The global score based on the seven components was calculated.

Component 1 Subjective sleep quality. Almost subjects subjective sleep quality appreciated us fairly good. They feel restful after their night sleep.

Component 2 Sleep latency. The length of time between going to bed and falling asleep, which means sleep latency is faster in males than females.

Component 3 Sleep duration. The total length of time spent asleep during the whole night is the sleep duration. It seems that the subjects studied had sleep duration about 7-8 hours for both genders, with a bed time earlier for males, than females. Generally No matter how many hours they have slept, if their sleep quality is impaired they won't feel refreshed the next day. Orr (2001) said that there are epidemiological data to suggest that an optimal amount of sleep is associated with longevity and so, too much or too little sleep does not promote good health.

In Glozier et al. study (2010) on young adults aged 17-24, self-reported shorter sleep duration is linearly associated with prevalent and persistent psychological distress in young adults and only the very short sleepers had a raised risk of new onset of distress. Sleep deprivation can also phase shift and decrease the amplitude of many individual rhythms. All these effects are dependent on the timing and the length of the waking state, but many of them are seen after only few hours of sleep deprivation.

Component 4 Habitual sleep efficiency. It is important that people to spend less time before fall asleep. Enough time asleep and short time lying in bed awake results an efficient sleep. It seems the subjects had a good sleep efficiency.

Component 5 Sleep disturbances. If the young adults wake up often during the night and then have difficulty getting back to sleep, may affect the next day activities. It seems they have no major or important reason to have less sleep efficiency. Females wake up the middle of the night or early morning once or twice a week. In the same time they have bad dreams and pain once or twice a week.

Component 6 Use of sleep medication. The subjects do not use sleep medication, last week. Sleep medication can make the quality of sleep worse.

Components 7 Daytime dysfunction. The subjects had no problem to stay awake in different activities and they had enough energy for activities. Their sleep

did not affect the way they function during next day. They had no trouble concentrating during the day, doing everyday activities, or having lack energy or feel sleepy during the day. Riemann et al. (2001) opinion's is that disturbances of sleep are typical for most depressed patients and belong to the core symptoms of the disorder. The sleep researches have demonstrated that besides disturbances of sleep continuity, in depression sleep is characterized by a reduction REM sleep quality.

Riedel and Lichstein, (2000) study suggests that reported daytime difficulties are produced by factors other than poor sleep, such as physiological or psychological arousal or sleep needed misperception.

Mongrain et al. (2005) evaluated the influence of morning types and evening types on sleep stages and quantitative sleep electroencephalograms on young adults. Their results agree with the hypothesis that homeostatic sleep regulation differs between morning types and evening types, with morning types showing indications of a higher rate of dissipation of sleep pressure during the night. So, morningness-eveningness seems to affect sleep in a sex-specific manner, with men being more affected by their chronotype.

Stickgold and Walker's study (2005) brings evidence that human declarative memory consolidation during sleep is more mixed, with older studies showing inconsistent evidence of a role for sleep, but more recent findings suggesting a strong role for early night, when the concurrent reductions in some neurotransmitters release may contribute to the consolidation process. Declarative learning has been seen to increase stage 2 of sleep. According to the authors all stages of sleep, except Stage 1 NREM, have again been implicated, in different forms of declarative memory.

Waterhouse and al. (2007) found out that a post-lunch nap improves alertness, mental and physical performance. In Postolache and Oren (2005) in terms of cognitive performance, sleep supplementation in the form of napping has been shown to have positive influence on cognitive tasks. Naps can markedly reduce sleepiness and can be beneficial when learning skills, strategy or tactics (Postolache and Oren, 2005).

According Davenne (2009) sleep and exercise have strong relationships; athletic performances have been shown to be dependent upon quality and quantity of sleep. The detrimental effects of sleep deprivation



are shown in its effects on physical performance manifested as a decline in the ability to perform maximal exercise.

### Conclusions

The data provided by the global score of the survey, show that young males have a lower score (< 5), that means a good quality of recovery. The young females have a higher global score (> 5) that means a lower sleep quality. It seems that males can manage better the sleep, than females.

Magee's study (2008) in Australian adults aged 18 to 59 years shows that two factor and three factor scoring were favored statistically over the single factor model. This study suggests that scoring the PSQI in relation to multiple factor could facilitate the assessment of sleep problems.

According to Backhaus and al. (2002) the PSQI had high test-retest reliability for patients with primary insomnia.

Hancock's study (2009) underline that the PSQI scores were suboptimal for dementia diagnosis using traditional diagnostic parameters, but were pragmatically useful in identifying non-demented 'memory complainers' with poor sleep quality. This observation may have therapeutic implications for these patients.

Both long and short sleep durations have been associated with negative health outcomes in middle-aged and other adults. In this way, Steptoe and al., 2006 study suggest that short sleep may be more of concern than long sleep in young adults.

### Aknowledgements

For all of our participants from my study I want to say thank you.

### References

- Backhaus J, Junghanns K, Broocks A, Riemann D, Hohagen F, 2002, Test-retest reliability and validity of the Pittsburgh Sleep Quality Index in primary insomnia. *Journal of Psychosomatic Research*, Volume 53, Issue 3, pp. 737-740. <http://www.ncbi.nlm.nih.gov/pubmed/12217446>.
- Beersma DG, 1998, Models of Human sleep regulation. *Sleep Medicine Reviews*, 2, 31-43. <http://www.ncbi.nlm.nih.gov/pubmed/15310511>.
- Buyse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ, 1989, The Pittsburgh Sleep Quality Index (PSQI): A new instrument for psychiatric research and practice. *Psychiatry Research*, 28(2), pp. 193-213. <http://www.ncbi.nlm.nih.gov/pubmed/2748771>.
- Davenne D, 2009, Sleep of athletes – problems and possible solutions. *Biological Rhythm Research* Volume 40, Issue 1, 2009, pp. 45-52. <http://www.tandfonline.com/doi/full/10.1080/09291010802067023>.
- Glozier N, Martiniuk A, Patton G, Ivers R, Li Q, Senserrick T, Woodward M, Norton R, Stevenson M, 2010, Short Sleep Duration in Prevalent and Persistent Psychological Distress in Young Adults: The Drive Study. *Sleep*. Volume 33, Issue 09, 2010. pp.1139-1145. <http://www.journalsleep.org/ViewAbstract.aspx?pid=27892>.
- Halson S, 2008, Nutrition, sleep and recovery. *European Journal of Sport Sciences*, March, 2008, 8(2) pp. 119-126.
- Hancock P, Larner AJ, 2009, Diagnostic utility of the Pittsburgh Sleep Quality Index in memory clinics. *International Journal of Geriatric Psychiatry*. 22 (11) pp. 1237-1241. <http://www.sciencedirect.com/science/article/pii/S0301051101000904>.
- Ionescu A, Anton B, 2004, *Dirijarea medicala a efortului*. Bucuresti, pp. 68.
- Magee C, Caputi P, Iverson D, Huang XF, 2008, An investigation of the dimensionality of the Pittsburgh Sleep Quality Index in Australian adults. *Sleep and Biological Rhythms*. Volum 6. Issue 4, pp. 222-227.
- Mollayeva T, Thurairajah P, Burton K, Mollayeva S, Shapiro C, Colantonio A, 2015, The Pittsburgh sleep quality index as a screening tool for sleep dysfunction in clinical and non-clinical samples: A systematic review and meta-analysis. *Sleep Medicine Reviews* 25 (2015) pp. 52-73. <http://www.ncbi.nlm.nih.gov/pubmed/26163057>.
- Mongrain V, Carrier J, Dumont M, 2005, Chronotype and Sex Effects on Sleep Architecture and Quantitative Sleep EEG in Healthy Young Adults. *Sleep*. Volume 28, Issue 7, 819-827. <http://www.journalsleep.org/ViewAbstract.aspx?pid=26173>.
- Orr WC, 2001, Sleep and Health. *International Encyclopedia of the Social & Behavioral Sciences*. pp. 14162–14166 <http://www.sciencedirect.com/science/article/pii/B0080430767038997>.
- Postolache TT, Ored DA, 2005, Circadian phase shifting, alerting, and antidepressant effects of bright light treatment. *Clinics in Sport Medicine*,



- 24, pp. 381-413.  
<http://www.ncbi.nlm.nih.gov/pubmed/15892931>.
- Riedel BW, Lichstein KL, 2000, Insomnia and Daytime functioning. *Sleep medicine Reviews*. Volume 4, Issue 3, June 2000, pp. 277-298.  
<http://www.sciencedirect.com/science/article/pii/S1087079299900746>.
- Riemann D, Berger M, Voderholzer U, 2001, Sleep and depression — results from psychobiological studies: an overview. *Biological Psychology*, Volume 57, Issues 1–3, pp. 67–103.  
<http://www.ncbi.nlm.nih.gov/pubmed/11454435>.
- Stepptoe A, Peacey V, Wardle J, 2006, Sleep duration and health in young adults. *Arch Intern Med*. 2006 Sep 18;166(16):1689-92.  
<http://www.archinte.jamanetwork.com/article.aspx?articleid=410837>.
- Stickgold R, Walker MP, 2005, Sleep and Memory: The Ongoing Debate. *Sleep*. vol. 28, no. 10, 2005 pp. 1225-1227  
<http://www.journalsleep.org/ViewAbstract.aspx?pid=26235>.
- Waterhouse J, Atkinson G, Edwards B, Reilly T, 2007, The rol of the short post-lunch nap improving cognitive, motor, and sprint performance in participants with partial sleep deprivation. *Journal of Sports Sciences*. Volume 25, Issue 14, pp. 1557-1566.  
<http://www.ncbi.nlm.nih.gov/pubmed/17852691>.