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Health behavior, sleep quality and subjective health status of foreign students in Hungary

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Introduction

The suprachiasmatic nucleus (SCN) regulates melatonin production associated with the pineal gland, which is synthesized in the dark and is responsible for the circadian rhythm of sleep-wake cycle. Melatonin is also anti-carcinogenic, antioxidant and antihypertensive, therefore it is important to synthesize it in appropriate amounts (Pévet, 2002; Reiter, Tan, & Mayo, 2003). During sleep, we relieve tiredness upon awakening, and therefore, it plays vital role in the physical and psychological regeneration. The importance in the adequate quantity and quality of sleep is emphasized throughout a plethora of published research. Reduced sleep length has many health-related adverse effects including reduced concentration, mood instability, learning disorders, increased susceptibility to addiction, and suicide (Faludi & Rozgonyi, 2018; Novak, Mucsi, Shapiro, Rethelyi, & Kopp, 2004; Pusztai & Fullér, 2018; Wong, Brower, Fitzgerald, & Zucker, 2004).

Insomnia occurs when falling asleep and or sleeping is disturbed resulting in daytime complaints. The criteria of insomnia is that falling asleep is more than half of an hour at least twice a week, for > 6 months (Lichstein, Durrence, Taylor, Bush, & Riedel, 2003). It is estimated that 8 to 18% of individuals worldwide are affected by various forms of insomnia (Ohayon, 2002).

The relationship between health behavior and sleep quality has been demonstrated by a number of studies (Tan, Alén, & Cheng, 2015; Virág, Berényi, & Kiss, 2014; Wang, Yin, Li, et al., 2015). Health risk behavior and health status were found to be associated with short and long sleep duration (Peltzer & Pengpid, 2016). Sleep hygiene protocols include various aspects of health behavior, such as healthy nutrition and regular exercise (Ellis, Hampson, & Cropley, 2002; Purebl, Bánki, & Novák, 2010).

Sleep and subjective health status are connected and are subjective health is often measured by sense of coherence. Coherence is an inner sense of safety and determines one's coping skill against internal and external stressors. Higher levels of coherence imply better stress management and improved mental and physical health (Antonovsky, 1987; Jeges & Varga, 2006; Skärsäter et al., 2009). In our previous research concerning nurses, sense of coherence and the occurrence of psychosomatic symptoms were associated, specifically, nurses who reported higher levels of coherence experienced less complaints regarding sleep habits. Based on our results, nurses with a strong sense of coherence were less exhausted compared to peers (Fusz, Tóth, Varga, Rozmann, & Oláh, 2017). The best time to improve sense of coherence is one's childhood, which should address healthier lifestyle and emphasize regular physical activity (Varga et al., 2012).

To summarize, sleep quality has a strong impact on the quality of life including management of psychosomatic symptoms. Nurses in training are also subjected to various conditions that affect their sleep patterns. Students from abroad, also due to their native global time zones and challenges of adjustment to new cultures, may experience disturbed sleep patterns. If these hold for longer, foreign students may offset their internal sleep control and insomnia may become a sleep habit. As there are many more students learning abroad, the problem of good sleep is no longer a secondary issue. Therefore, the purpose of this research was to analyze sleeping habits and sleep quality among foreign students studying in Hungary. We argue that sleep patterns of these students will have an impact on their health status in later life and therefore is a topic of interest.

Methods

Cross-sectional, quantitative, correlational research was implemented in the Fall of 2018. A convenient sampling was used by posting an online, English questionnaire to respondents to complete. Foreign students throughout five universities (Budapest, Debrecen, Pécs, Szeged and Veszprém) were contacted by email lists and were asked to fill in the questionnaire. Students were offered anonymity, responding was voluntary. The questionnaire was available for a duration of three months in which students could respond. Answering to the questionnaire had to be completed in one sitting. Ethical review board permission was obtained before the onset of the research. There were no specific inclusion/exclusion criteria developed besides the respondent had to be a non-Hungarian national studying at one of the universities where the sample was selected from. However, as with online surveys, researchers had no control to make sure that only

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foreign students entered responses. It is assumed that foreign students did not consult with Hungarian peers in the process of answering to the survey. As for handling missing data, no specific protocol was implemented to replace items. Subjects with missing data therefore were excluded from subsequent analysis. Measuring subjective health, students evaluated their health as poor, acceptable, good and excellent. Nutritional status among students was determined using the body mass index (BMI) (cut point at 24.1 kg/m^2). Frequency of psychosomatic complaints was measured in the span of the last thirty days.

Instruments

The general health status questionnaire contained items regarding health behavior and subjective health status. Health behaviors were surveyed by assessing tobacco use (yes/no), alcohol consumption (yes/no), and regular exercise. Exercise was defined as 3 days per week, moderate intensity exercise (yes/no). Additionally, subjects were asked to estimate the number of days/h per week they exercised and characteristics of their diet. Subjective health status was measured by a 5-point Liker scale (state of health from bad = 1 to excellent = 5), by the presence of any psychosomatic complaints and the potential of chronic disease. Sleep quality data included the following: changes in sleeping habit, factors leading to sleep problems (such as insomnia, dyssomnia), activities performed when sleep is delayed.

The Athens Insomnia Scale (AIS) by Soldatos, Dikeos, & Paparrigopoulos (2000) was used to measure insomnia of respondents, which is a tool often used in epidemiological studies for measuring insomnia. It consists eight questions which measure night complaints and daytime consequences. Higher scores mean worse sleep quality (24 being the maximum score). Scores above 10 points on the scale represent insomnia. The eight characteristics include the following: sleep induction, awakening during the night, total sleep duration, final awakening, sleep quality, sense of well-being, functioning capacity and sleep during the day. Cronbach's alpha for this scale was 0.92 in the current research.

To assess sense of coherence, the 13-item of Sense of Coherence Scale (SOC13) was used (Antonovsky, 1987). The central concept of the salutogenesis model is sense of coherence, which is considered a predictor of health. Sense of coherence also indicates one's stress management skills against internal and external stressors. Minimum score to be obtained on the scale is 13, maximum is 91. Higher scores indicate a stronger sense of coherence. The SOC13 scale demonstrated a reliability of 0.98 in the current research.

Statistical analysis

Statistical analyses were performed by using SPSS 20.0 and Microsoft Excel software, including the following statistical methods: descriptive statistics, ANOVA, independent *t*-test and Pearson correlation. We used the Kolmogorov-Smirnov test to assess normality. Level of significance was set at 5%, results were accepted at 0.8 statistical power (20% type II error rate).

Results

Sociodemographic data

A total of 241 students from 4 continents (including Africa, America, Asia and Europe) completed the questionnaire. Response rate was 60%, the average age of participants was 23.69 years (SD: 3.56). Majority of students were women (61.4%) who resided in Pécs (52.3%) and originated from Africa (65.6%). Of those from Africa, a large proportion came from Nigeria (44%). We categorized participants into five groups based on their education tracks: general medical students (38.2%), students of health sciences and psychology (23.2%), dentist and pharmacist students (8.7%), engineers (15.8%) and economists (14.1%).

Health behavior and subjective health status

Most (80.9%) students routinely participated in some form of physical activity (regularly 44%, sometimes 36.9%), and 134 reported participating three times a week (mean 3.12, SD: 2.0). Their average commitment to sports was 1 h (61.99 min). Dentists and pharmacy students did more physical activity (average 4.5 times a week), while the others were engaged significantly less ($F = 2.71$, $p = 0.03$).

Regarding diet, 20.7% of the students surveyed ate healthy, 43.6% partially, while 35.7% were not on a healthy diet. Students keeping to a healthy diet also performed an average of 3.87 times per week physical activity. Students who reported not eating a healthy diet also reported an average of 2.29 times per a week regular exercise. Differences were significant (ANOVA post hoc, $p = 0.015$) across groups.

As for tobacco use, 6.2% of participants reported smoking regularly and 11.2% consumed alcohol with some frequency. Most (79.7%) African students never smoked ($p = 0.03$). In reference to caffeine uptake, 36.1% of African students never drank coffee, compared to 54.7% of Asian students ($p < 0.001$). Measuring subjective health, students evaluated their health as poor, acceptable, good and excellent. Most individuals (59.3%) considered their health good, some form of chronic illness was present in 13 students (5.4%) such as, irritable bowel syndrome, hypothyroidism and anemia. Nutritional status among students was determined using the body mass index (BMI): 24.1 kg/m^2 (SD: 4.45).

Frequency of psychosomatic complaints was measured in the span of the last thirty days. The most common complaint was fatigue (2.93 times/month) and a set of general sleeping problems (2.09 times/month). On average, 11.81 psychosomatic complaints were reported (Table 1).

European students reported more complaints (16.09/month) compared to the African student population, (10.27/month, ANOVA post hoc test: $p = 0.016$). Healthy nutritionists reported fewer psychosomatic complaints ($F = 3.85$; $p = 0.023$). The difference between eating healthy (8.59 complaints/month) and unhealthy (14.57 complaints/month) was highly significant ($p = 0.008$) (Table 2).

Students achieved a mean of 56.22 points (SD: 11.28) on the SOC13 scale, there was a correlation between age and a sense of coherence ($r = 0.2$; $p = 0.002$), older age indicating growing sense of coherence. Sense of coherence and psychosomatic were negatively correlated ($r = -0.25$; $p < 0.001$); students with stronger sense of coherence had less psychosomatic complaints. Healthy nutritionists had a higher sense of coherence ($F = 4.53$; $p = 0.012$) (Table 2), the post hoc ANOVA test showed those on a 'no' healthy diet had the worse sense of coherence compared to partial or regular dieters.

Students whose weight had not changed since their arrival to Hungary reported a higher sense of coherence ($F = 3.78$; $p = 0.024$; post hoc test: $p = 0.030$ and $p = 0.008$). Students with outstanding health reported significantly less psychosomatic symptoms ($F = 16.35$; $p < 0.001$), and a stronger sense of coherence ($F = 8.44$; $p < 0.001$)

Table 1
Psychosomatic complaints ($n = 241$).

Psychosomatic symptoms		
In the last 1 month how many times…	Mean	SD
…have severe headache or migraine	1.37	1.78
…feel upper or lower back pain	1.84	2.46
…have sleeping problems	2.08	2.64
…feel exhausted	2.93	2.92
…have too fast or irregular heartbeat	1.00	1.99
…have acid reflux, stomach or abdominal pain	1.67	2.61
…have diarrhea (not caused by an infection)	0.92	1.87
Psychosomatic symptoms - total	11.81	11.22

Table 2
Subjective health status and healthy diet (n = 241).

Health status measures with scales	Healthy diet	n	Mean	SD	ANOVA
Psychosomatic factors (symptom/month)	No	65	14.57	13.178	p = 0.023
	Partially	73	11.07	9.618	
	Yes	39	8.59	9.530	
SOC13 (point)	No	86	53.55	11.717	p = 0.012

Table 3
Subjective health status and other parameters (n = 241).

Health status measures with scales	Subjective health status	n	Mean	SD	ANOVA
Psychosomatic factors (sign/month)	Adequate	33	19.18	13.75	p < 0.001
	Good	105	11.86	10.27	
	Excellent	38	5.08	6.55	
SOC13 (point)	Adequate	44	52.82	10.85	p < 0.001
	Good	143	55.31	10.98	
	Excellent	53	61.36	10.98	

(Table 3). The group with "excellent" subjective health had significantly less complaints compared to the other groups ($p < 0.001$) and had stronger sense of coherence than the rest of the groups (p < 0.001). However, BMI did not show any difference among the groups (F = 0.61; $p = 0.55$).

Sleep habits and sleep quality

In our survey, students slept an average of 6.87 h per day (SD: 1.44). Respondents achieved 7.12 points (SD: 4.76) on the Athens Insomnia Scale. About 30.3% of students accumulated > 10 points on the AIS, which was a sign of insomnia. More than half (53.5%) of students genuinely believed their chronotype was evening-type ("night owl"). Causes of poor sleep varied from academic stress (70.5%) to private life stress (38.6%) (Table 4).

Almost half (49%) of participants experienced substantially lower qualities of sleep since they had begun their university studies in Hungary. To battle sleep deprivation, watching television (42.7%) was the top activity followed by listening to music (41.5%), and to a smaller extent, trying various forms of sleeping aids (3.3%) (Table 5).

Asian students reported the most daily sleep (7.38 h, SD: 1.16) which was significantly different from all other natives (F = 3.14, $p = 0.02$). Medical students slept far less than engineers (p = 0.02). Students with a good diet slept longer (F = 4.62; $p = 0.011$) and experienced higher levels of sleep quality (F = 4.52; $p = 0.012$) compared to all other groups (Table 6). Diet also affected sleep quality measured by the AIS, those on 'no' diet reported the worst sleep quality compared to groups with partial and regular dieting.

Students smoking slept worse compared to students who do not smoked ($p = 0.002$). Students who slept longer reported better sleep quality ($r = -0.8, p < 0.001$) and those who experienced better sleep quality reported less psychosomatic complaints ($r = -0.43$, p = 0.002). Not surprisingly, students on a healthy diet slept more (F = 3.06; $p = 0.011$) and had better sleep quality (F = 8.80; $p = 0.012$) (Table 6).

'Night owls' slept less ($p = 0.007$) and scored higher on the insomnia scale (p < 0.001) (Table 7). They also had an average of 14.97 psychosomatic complaints per month. Morning-type individuals however reported only 5.95 complaints ($p = 0.001$).

Table 4
Causes of poor sleep and tiredness.

Causes of poor sleep and tiredness	Frequency	%
School stress	170	70.5
Private life stress	93	38.6
Psychological condition (e.g. anxiety, depression)	56	23.2
Uncomfortable bed	30	12.4
Pain	28	11.6
Noise	25	10.4
Gastrointestinal problem	9	3.7
Child wakes	8	3.3

Table 5
Techniques to help fall asleep.

What do you do when you can't sleep?	Frequency	%
Watch television	103	42.7
Listen to music	100	41.5
Read	65	27.0
Pray	47	19.5
Meditate	34	14.1
Use tisane, herbal supplements	9	3.7
Take sleeping pills	8	3.3
Play games or use social media on phone	8	3.3
Other: cry, eat, drink hot milk with honey, engage in sex, think out loud, write poetry		

Table 6
Differences by sleep and diet.

Sleep	Healthy diet	N	Mean	SD	ANOVA
Sleeping time (hours/day)	No	79	6.87	1.372	p = 0.011
	Partially	102	6.62	1.535	
	Yes	50	7.36	1.208	
AIS	No	86	8.30	4.982	p = 0.012
	Partially	105	6.64	4.188	
	Yes	50	6.08	5.150	

Discussion

The purpose of this research was to assess sleep quality and sense of coherence of foreign university students in Hungary. As far as the amount of sleep considered, this research showed, that except for Asian students, students from the rest of the world experienced less sleep than biologically required (6.87 h per day). According to the National Sleep Foundation, the recommended daily sleep rate for young adults is 7–9 h, foreign students slept significantly less in this research (Hirshkowitz et al., 2015). Why Asian students, despite drinking more coffee, did much better on sleep amount and quality of sleep is a question of further investigation. We assume that Asian students were on a different diet, used technique of traditional relaxation and participated on more exercise than peers. As for sense of coherence, Asian students have a tendency to form strong social bonds when abroad, such networks may have also contributed to better subjective health outcomes compared to other groups assessed in this research. Whether or not the Asian experience of foreign students may be a role model for other cultures is a topic recommended for future research.

We also saw that medical students slept less than engineers. When compared to a 2016 survey, Hungarian students in general slept 7.12 h, outperforming foreign medical students in the paper (Fusz, Faludi, Pusztai, Sebők, & Oláh, 2016). Again, why foreign medical students

Table 7
Sleep and chronotype.

Sleep	Chronotype	N	Mean	SD	t-Probe
Sleeping time (hours/day)	More like morning person	107	7.14	1.111	p = 0.007
	More like night owl	124	6.63	1.635	
AIS	More like morning person	112	5.89	4.327	p < 0.001
	More like night owl	129	8.18	4.874	

demonstrated less balanced sleeping patterns is a speculation at this point. Medical education in Hungary requires the memorization of vast amounts of knowledge which may lead to sleep disturbances. The acquisition of such knowledge goes along with long studying hours (night owl chronotype), bad diet habits and less frequent physical exercise, which altogether were shown to be associated with worse sleep quality of respondents. Better sleep quality was also seen to reduce the amount of psychosocial complaints one reported in this research. However, we did not investigate the amount psychosocial complaints across various university faculties but will address such differences (if any) in our future analysis of the current data.

As for the insomnia measure (AIS), about 30% of students achieved > 10 points on the AIS, which was a sign of insomnia. This is clearly a significant proportion which must be followed up. Insomnia, even in younger age, leads to disturbed quality of life, impairs concentration (a negative outcome for studying students) and develops psychosocial symptoms. In fact, those categorized as 'night owls' slept less, scored higher on the insomnia scale and had an average of almost 2.5 times more psychosomatic complaints per month than morning persons. Although this research was cross-sectional, it would be interesting to follow up foreign students for longer to understand whether sleeping problems develop into chronic illnesses over time. Our full sample reported 11.81 psychosomatic complaints/month on average. Whether or not this is a lot, we compared our data to a 2016 survey in which Hungarian students reported psychosomatic complaints per month being 24.86 on average, roughly about twice that of foreign students' (Fusz et al., 2016). This however should not mean that foreign students require less attention from local school/health services.

Smokers' sleep quality was worse than non-smokers, this result is line with other researches (Gibson, Munafò, Taylor, & Treur, 2018). Diet also affected sleep quality measured by the AIS, those did not observe a healthy diet reported the worst sleep quality compared to groups with partial and regular dieting. Not surprisingly, students on a healthy diet slept longer and better than any other groups. Diet may pose a challenge for international students when moving to a different culture. Authors argue that local dietitians should be prepared to advise foreign students when arriving to a local university about what foods are considered healthy in local markets and how to adjust their diet to stay healthy over the course of their education. While BMI was not directly related to any of our main measures in this research, good body weight is generally considered a prerequisite of good personal and subjective health. Subjective health, to a very high degree, was also impacted by academic stress (70.5%) and various forms of personal life stressors (38.6%). These forms of stress were also behind poor sleep quality. Alarmingly, 49% of participants experienced reduced levels of sleep quality since they had begun their university studies in Hungary. The proportion is large and warrants attention from local mental health services and support groups to help students overcome their academic and private life problems. Good sleep, while often overlooked, is fundamental to health and therefore should be part of the assessment performed by local nurses when meeting foreign students in university health services.

Finally, sense of coherence, an internal mechanism to respond to stress, was clearly related to sleep quality and subjective health. The stronger sense of coherence had been, the better sleep students experienced and the better subjective health they reported. Strong sense of coherence was also correlated with healthy eating, showing that those with strong sense of coherence did not gain excess weight since they had begun studies in Hungary. Those with strong sense of coherence had also less psychosomatic complaints to report. Our results are line with other researches where strong sense of coherence was found to discriminate healthy and unhealthy lifestyles of students (Chan et al., 2014; Miyataa, Araia, & Suga, 2015; Varga et al., 2012).

Moving to another country may negatively impact sense of coherence by introducing many new stressors in life. Some of these stressors (i.e., language barriers) are difficult to deal with and challenge one's view of his/her own capacity to manage studies as well. Nurses in university health services should be prepared to assess coping skills of foreign students and intervene, if necessary, to restore such capacity.

In summary, this paper supported that foreign students, regardless of their university track, experience sleeping problems, and such problems hold potential to impact on their life in general as well as on their studies. Since sleep is a critical mechanism to balance or homeostasis, authors claim that international students should be more frequently seen at the beginning of their transfer to another country by mental health nurses to make sure that they receive support to best adjust to new cultures. Authors also argue that asking about sleep quality should be routine part of the nursing assessment when foreign students seek health attention at university health services.

Limitations

Authors acknowledge that the sample selection in this research was convenient and therefore was not representative of the foreign sample population studying in the country. Also, outcomes of this research may not be directly translated to other countries as the culture of Hungary and its higher education system may be very different from others. As for statistical conclusions, non-random sampling violated the prerequisites for the use of parametric statistics, however, due to normal distribution of main measures, we assumed that results of parametric statistics were not biased.

References

Antonovsky, A. (1987). *(szerk.): Unraveling the mystery of health. How people manage stress and stay well.* San Francisco: Jossey-Bass Publishers.

Chan, J. W. Y., Lam, S. P., Li, S. X., Yu, M. W. M., Chan, N. Y., Zhang, J., & Wing, Y. K. (2014). Eveningness and insomnia: independent risk factors of nonremission in major depressive disorder. *Sleep, 37*(5), 911–917.

Ellis, J. J., Hampson, S. E., & Cropley, M. M. (2002). Sleep hygiene or compensatory sleep practices: An examination of behaviors affecting sleep in older adults. *Psychology, Health & Medicine, 7*(2), https://doi.org/10.1080/13548500120116094.

Faludi, B., & Rozgonyi, R. (2018). The place of the management of insomnia in sleep-medicine: pharmacological and non-pharmacological methods. [Az insomniák kezelésének helye az alvásmedicinában: gyógyszeres és nem gyógyszeres eljárások]. *Clinical Neuroscience/Ideggyogy Sz, 71*(5–6), 149–159. https://doi.org/10.18071/isz.71.0149 (Hungarian).

Fusz, K., Faludi, B., Pusztai, D., Sebők, N., & Oláh, A. (2016). Insomnia and habits to help to fall asleep among adults. [Insomnia és elalvást segítő szokások felmérése felnőttek körében]. *Orvosi Hetilap, 157*(49), 1955–1959. https://doi.org/10.1556/650.2016.30593.

Fusz, K., Tóth, Á., Varga, B., Rozmann, N., & Oláh, A. (2017). Different work schedules of nurses in Hungary and their effects on health. *Ideggyógyászati Szemle/Clinical Neuroscience, 70*(3–4), 136–139. https://doi.org/10.18071/isz.70.0136.

Gibson, M., Munafò, M. R., Taylor, A. E., & Treur, J. L. (2018). Evidence for genetic correlations and bidirectional, causal effects between smoking and sleep behaviours. *Nicotine & Tobacco Research*. https://doi.org/10.1093/ntr/nty230.

Hirshkowitz, M., Whiton, K., Albert, S. M., Alessi, C., Bruni, O., DonCarlos, L., Hazen, N., et al. (2015). National Sleep Foundation's sleep time duration recommendations: Methodology and results summary. *Sleep Health*. https://doi.org/10.1016/j.sleh.2014.12.010.

Jeges, S., & Varga, K. (2006). Unravelling the mystery of the sense of coherence. *European Journal of Mental Health, 1*(1), 45–71.

Lichstein, K. L., Durrence, H. H., Taylor, D. J., Bush, A. J., & Riedel, B. W. (2003). Quantitative criteria for insomnia. *Behaviour Research and Therapy, 41*, 427–445. https://doi.org/10.1016/S0005-7967(02)00023-2.

Miyataa, J., Araia, H., & Suga, S. (2015). *Characteristics of the nurse manager's recognition behavior and its relation to sense of coherence of staff nurses in Japan. 22 (1),* Elsevier9–17.

Novak, M., Mucsi, I., Shapiro, C. M., Rethelyi, J., & Kopp, M. S. (2004). Increased utilization of health services by insomniacs – An epidemiological perspective. *Journal of Psychosomatic Research, 56*, 527–536. https://doi.org/10.1016/j.jpsychores.2004.02.007.

Ohayon, M. M. (2002). Epidemiology of insomnia: What we know and what we still need to learn. *Sleep Medicine Reviews, 6*(2), 97–111. https://doi.org/10.1053/smrv.2002.0186.

Peltzer, K., & Pengpid, S. (2016). Sleep duration and health correlates among university students in 26 countries. *Psychology Health and Medicine, 21*(2), 208–220. https://doi.org/10.1080/13548506.2014.998687.

Pévet, P. (2002). Melatonin. *Dialogues in Clinical Neuroscience, 4*(1), 57–72.

Purebl, G., Bánki, M. C., & Novák, M. (2010). Insomnia - Diagnostic and therapeutic guide [Insomnia – Diagnosztikus és terápiás útmutató]. *Pszichiátriai Útmutató,* 203–223 (Hungarian).

Pusztai, D., & Fullér, N. (2018). Sleep disorders among ICU patients [Alvászavar az intenzív osztályon]. *Nővér, 31*, 17–23 évf., 1. sz.

Reiter, R. J., Tan, D. X., & Mayo, J. C. (2003). Melatonin as an antioxidant: Biochemical mechanisms and pathophysiological implications in humans. *Acta Biochimica Polonica, 50*, 1129–1146 doi: 0350041129.

Skärsäter, I., Rayens, M. K., Peden, A., Hall, L., Zhang, M., Agren, H., & Prochazka, H. (2009). Sense of coherence and recovery from major depression: A 4-year follow-up. *Archives of Psychiatric Nursing, 23*(2), 119–127. https://doi.org/10.1016/j.apnu.2008.04.007.

Soldatos, C. R., Dikeos, D. G., & Paparrigopoulos, T. J. (2000). Athens Insomnia Scale: Validation of an instrument based on ICD-10 criteria. *Journal of Psychosomatic Research, 48*(6), 555–560.

Tan, X., Alén, M., & Cheng, S. M. (2015). Associations of disordered sleep with body fat distribution, physical activity and diet among overweight middle-aged men. *Journal of Sleep Research, 24*(4), 414–424. https://doi.org/10.1111/jsr.12283 Epub 2015 Feb 2.

Varga, K., Tóth, Á., Roznár, J., Oláh, A., Betlehem, J., & Jeges, S. (2012). Is 'Meaningfulness' a general mediating factor? The salutogenic revolution of question-setting in health science and occupational psychology. *European Journal of Mental Health, 7*, 72–89.

Virág, M., Berényi, K., & Kiss, I. (2014). Epidemiological investigation of the relationship between insomnia and lifestyle [Insomnia és az életmód kapcsolatának epidemiológiai vizsgálata]. *Magyar Epidemiológia,* 125–134 11. évf. 1-2.szám. (Hungarian).

Wang, J., Yin, G., Li, G., et al. (2015). Efficacy of physical activity counseling plus sleep restriction therapy on the patients with chronic insomnia. *Neuropsychiatric Disease and Treatment, 11*, 2771–2778.

Wong, M. M., Brower, K. J., Fitzgerald, H. E., & Zucker, R. A. (2004). Sleep problems in early childhood and early onset of alcohol and other drug use in adolescence. *Alcoholism, Clinical and Experimental Research, 28*(4), 578–587. https://doi.org/10.1097/01.ALC.0000121651.75952.39.