journal homepage: http://kont.zsf.jcu.cz
DOI: 10.32725/kont.2022.013

KONTAKT / Journal of nursing and social sciences related to health and illness

Original research article

The sleep quality of university students: a multicenter study

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Abstract
Introduction: Sleep is an important component of lifestyle. It affects the quality of life and translates into the effectiveness of activities during the day. Poor quality sleep can lead to physical, psychological and social disorders. Sleep is considered a sociological, anthropological and cultural phenomenon. The aim of this study was to compare the sleep quality of students from different countries.
Methods: The study was conducted among 532 Polish, Turkish, Hungarian and Greek students, between December 2016 and March 2017. A diagnostic survey and a questionnaire technique were used. The link to the online questionnaire was sent to students via the Internet, or made available as a printed copy. Student opinions were measured using a 5-point Likert scale.
Results: The data showed that the majority of students sleep well, but have sleepless nights due to study and social life, when they wake up sleepless and early. In-depth analysis showed a statistical significance between the studied components of students' sleep and their country of origin: length and quality of sleep, falling asleep due to study and social life, feeling rested in the morning, and problems with waking up and falling back to sleep.
Conclusions: Significant differences were found in the sleep patterns of students of different nationalities. Issues related to sleep and its problems should be discussed by organisations, as well as those responsible for constructing educational programmes and planning studies.

Keywords: Cultural differences; Sleep quality; Student

Introduction

Sleep is one of the basic biological processes that affects health and well-being. It plays an important role in promoting and maintaining good health, which allows for physiological restoration and regeneration, and is crucial in the process of memory consolidation (NHLBI, 2022). Sleep time is the most commonly studied measure of sleep in relation to health. A person sleeps an average of a third of his or her life. Guidance for adults is set to a minimum of 7 hours of sleep per night to promote optimal health and wellbeing (Buxton and Marcelli, 2010; NHLBI, 2022; Watson et al., 2015).

Sleep is a natural state of rest, which proceeds with no consciousness, allows the body to regenerate and is necessary for proper functioning (Bhatnagar and Chittora, 2018; Stenberg, 2007). It is an important physiological process that is important for the proper physical, mental and emotional health of an individual (Airhihenbuwa et al., 2016). Studies confirm the link between sleep length, quality, and the occurrence of health problems, e.g., risk of obesity, hypertension, diabetes, cardiovascular disease and mental disorders (Hale et al., 2020; Sa et al., 2020; Watson et al., 2015). Because sleep quality affects mood and a positive approach to life (Doolin et al., 2018), sleep affects daily functioning.

Restful sleep is one of the most important health-promoting factors and is considered important for health. Sleep quality makes a person happy and provides constant alertness during the day (St-Onge et al., 2016). During the night, as the human body rests, there are important physiological and mental processes. In terms of mental health, sleep counteracts apathy and despondency, enhances the feeling of satisfaction, harmonizes emotional states, reduces mental tension, and helps in responding to stress. During sleep, important physiological functions occur, such as repairing cells damaged during the day, restoring the sensitivity of receptors, or perpetuating memory. Also, it is mainly during sleep that certain hormones are secreted. The components of sleep health are associated with poorer cardiometabolic health, mental health status, quality of life, and increased mortality risk.

Sleep significantly impacts the quality of human life. There are many ways to promote regular sleep – and this is defined as sleep hygiene. It can be achieved by changes to and management of cognitive, behavioral, and physiological factors and processes associated with sleep.

Sleep is also considered a sociological, anthropological and cultural phenomenon. Sleep behaviors and practices are not random occurrences but are shaped by cultural and societal norms (Williams et al., 2015). Culture is defined in different ways, but in the context of health behaviors as the unique

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http://doi.org/10.32725/kont.2022.013
Submitted: 2021-07-27 • Accepted: 2022-04-19 • Prepublished online: 2022-05-10
KONTAKT 24/2: 147–153 • EISSN 1804-7122 • ISSN 1212-4117

shared values, beliefs, and practices that are directly related to the behavior (Williams et al., 2015). Culture influences "how, where, how much, and with whom we sleep" (Airhihenbuwa et al., 2016). Significant differences have been observed in the sleeping patterns in different cultures, traditions, and historical eras (Cheung et al., 2021). Sleep is socially planned and culturally institutionalized, as well as practiced with varying meanings across racial, ethnic, cultural, and religious groups. For example, Hopi Native Americans believe that optimal sleep and daydreaming are induced by a butterfly. In other cultures, dream associations are made with cosmological, religious, or spiritual events, to observe culturally significant phenomena (Williams et al., 2015). Different traditions and societies are presented with different sleeping locations, patterns, duration, frequency, and regularity. There are cultures and religions that also regulate the rules about sleeping partners. Studies have shown that sleep is influenced and shaped by cultural factors, including cultural values, beliefs and practices (Patel et al., 2010). However, a systematic understanding of how cultural factors in countries may influence sleep duration and sleep disturbances is still lacking (Jeon et al., 2021).

The season and the weather also affect sleep quality. The researchers determined that the strongest seasonal effects are observed for wake-up time and sleep time, especially in the spring season – when wake-up time is shorter and sleep time is shorter (compared to the winter season). Sleep duration also slightly decreases as the daytime lengthens (between the winter and summer solstice). Bedtime and wake-up times happen a little later as the outside temperature rises (Mattingly et al., 2021).

For many young people, time at university is the moment when they begin to enter adulthood. They become independent and fully responsible for their lives. They make choices in relation to every aspect of life, including lifestyle and health choices. There are many factors that influence these choices – social contacts, individual preferences, and the physical and macroeconomic environment (Eyre et al., 2004).

Sleeping difficulties are a common occurrence in university students (Friedrich and Schlarb, 2018). Many studies report their bad sleep quality (Lund et al., 2010; Mah et al., 2018; Marques et al., 2017; Schlarb et al., 2017). The quality of sleep of students depends not only on biological and mental determinants, but also on cultural conditions related to geographical location and the amount of daylight (Fonseca and Genzel, 2020). Sleep problems are a common occurrence in college students. Insomnia, nightmares, and impaired sleep quality lead to a number of mental health issues, as well as impaired academic performance (Lemma et al., 2014; Friedrich and Schlarb, 2018). Poor quality of sleep has a negative effect on academic performance of students. The quantity and quality of sleep are strongly related to students' learning abilities. Short and qualitatively poor sleep affects unsatisfactory academic performance and poor interpersonal relationships, which may predispose to mental illness (Wondie et al., 2021).

The purpose of this study was to compare the quality of sleep in students from Poland, Hungary, Greece and Turkey.

Materials and methods

A diagnostic survey and the survey technique were used. The cross-sectional and multicenter study was conducted between December 2016 an March 2017. The major research question was: are there any differences in the quality of sleep between students from different countries? The study was a part of a larger project about health behaviors of students from four countries.

Ethical consideration

The project received a positive response from The Bioethics Committee of the Regional Chamber of Physicians and Dentists in Gdansk No: KB-15/16. All participants fully understood the research and agreed to respond to the questionnaires.

Participants

Data were collected in four countries: Hungary, Greece, Poland and Turkey. Respondents were students from partner universities with whom universities had an agreement under the Erasmus+ program. At least two volunteers from each of the participating countries were recruited. These were students who had taken part in Erasmus+ activities in Piła and Słupsk in previous years. Their translated a research tool and a letter of intent into their national language and recruited participants. Professional translators verified the linguistic accuracy of the content, ensuring the quality of the translation. The questionnaire was adapted for comparative research utilizing cultural adaptation. Before the main survey, a pilot study was conducted to confirm the respondents' understanding of the questions.

Tools

To obtain the necessary data, we used a self-designed questionnaire. Based on literature, a research tool was created, which consisted of 85 closed questions, of which 6 were about sleep and rest. In the study, we used questions concerning two components of sleep: length and quality. Students highlighted their responses on a 5 point Likert scale with a neutral choice (from strongly disagree to strongly agree). The validation of the questionnaire fulfilled the requirements for translation and verification of the correctness of the questionnaire design (Tafforeau et al., 2005).

Course of the study

During the recruitment process the snowball sampling method was used. This method of non-random sampling relied on the recruitment of participants by other participants. Scientists recommend it as a sample selection method in order to facilitate scientific research and reach the local community (Naderifar et al., 2017). First a researcher distributed the survey questionnaire to her network of students who had participated in Erasmus+ program at their university. They gave it their colleagues, and thanks to this, it was possible to reach the academic community in a given country. The invitation letter informed potential participants of the aim of the survey, assuring them that it would be anonymous, confidential, and voluntary. Respondents were informed that they could opt out of the study without any reason and with no consequences. An email with a link to the questionnaire was sent to students. Participants completed the survey at home or in their place of work. A paper-pencil questionnaire was provided for participants who could not access the online survey. The respondents' answers were entered anonymously into the data collection worksheet. Each questionnaire was checked for completeness.

Methods of statistical analysis

Data analysis was performed using Statistica 8.0 PL software (StatSoft, Tulsa, OK, USA). To verify the occurrence of differences between the groups of students, the Kruskal–Wallis test (H) was used. The results were presented as a descriptive statistics and frequency table. The frequency distribution for each

variable and the most common answer was defined, with the speculated level of significance of $p = 0.05$.

Results

The research involved Polish, Greek, Hungarian, and Turkish students ($n = 532$) from four universities. Men accounted for 44.7% of the participants and women 55.3% (Table 1).

Table 1. Students' characteristics by nationality and gender

	Women		Men		Total
	N	%	*N*	%	*N*
Poland	74	48.1	80	51.9	154
Hungary	83	48.8	87	51.2	170
Greece	50	52.6	45	47.4	95
Turkey	54	47.8	59	52.2	113

The survey data shows that the majority of students sleep well (57.1%). Students from Greece were the sleepiest (72.7%), and Hungary the least sleepy (42.3%). After a night's sleep, 41.4% of students get up well-rested, most of these were from Turkey (58.9%), and the least from Hungary (21.2%). 56.8% of respondents sleep 7–8 hours at night. Most students from Turkey sleep the optimal number of hours (82.3%), and the least from Hungary (41.2%). 28.2% of respondents wake up in the middle of the night and have trouble falling back to sleep again. This phenomenon is least common in students from Poland (10.6%), and most common among students from Turkey (63.7%). Students tend to have sleepless nights due to studying (43.2%) and social events (19.2%). This happens most often to students from Turkey (77.0% and 30.1% respectively).

In-depth analysis of the data revealed a statistical significance between the studied sleep components of the students and their country of origin (Table 2): length and quality of sleep (Fig. 1 and 2), falling asleep due to studying and social life (Fig. 3 and 4), feeling rested in the morning, and the problem of waking up and falling asleep again (Fig. 5 and 6).

Table 2. Quality and length of students' sleep and their country of origin: nonparametric and descriptive statistics

Parameter	Country of origin				Statistical test
	Poland *N* = 154	Hungary *N* = 170	Greece *N* = 95	Turkey *N* = 113	
I sleep 7–8 hours every night					
I strongly disagree	11.7%	14.1%	4.2%	1.8%	
I disagree	27.3%	27.1%	4.2%	7.1%	H = 60.09729
I neither agree nor disagree	11.0%	17.6%	26.3%	8.8%	$p = 0.0000$
I agree	33.1%	28.2%	33.7%	52.2%	
I strongly agree	16.9%	13.0%	31.6%	30.1%	
I miss sleep because of studying					
I strongly disagree	26.0%	10.6%	19.4%	–	
I disagree	19.5%	17.6%	38.9%	6.2%	H = 89.26138
I neither agree nor disagree	21.4%	27.1%	23.6%	16.8%	$p = 0.0000$
I agree	21.4%	29.4%	12.9%	55.8%	
I strongly agree	11.7%	15.3%	5.2%	21.2%	
I miss sleep because I'm partying					
I strongly disagree	32.5%	67.1%	14.7%	3.5%	
I disagree	26.0%	18.2%	33.7%	42.5%	H = 115.3166
I neither agree nor disagree	18.2%	7.1%	30.5%	23.9%	$p = 0.0000$
I agree	13.0%	2.4%	14.7%	23.0%	
I strongly agree	10.3%	5.2%	6.4%	7.1%	
I sleep well					
I strongly disagree	6.5%	14.1%	2.1%	3.5%	
I disagree	21.4%	16.5%	6.3%	8.0%	H = 39.56201
I neither agree nor disagree	14.3%	27.1%	17.9%	23.7%	$p = 0.0000$
I agree	40.1%	35.3%	48.4%	43.4%	
I strongly agree	17.7%	7.0%	25.3%	21.4%	
I wake up rested					
I strongly disagree	7.8%	10.6%	3.2%	2.7%	
I disagree	36.4%	25.9%	6.3%	14.2%	H = 60.30128
I neither agree nor disagree	14.9%	42.3%	33.7%	23.9%	$p = 0.0000$
I agree	31.8%	15.3%	33.7%	36.3%	
I strongly agree	9.1%	5.9%	23.1%	22.9%	
I wake up a few hours too early and I can't get back to sleep					
I strongly disagree	39.0%	21.2%	27.4%	10.6%	
I disagree	29.2%	28.2%	44.2%	18.6%	H = 71.26050
I neither agree nor disagree	18.2%	27.1%	10.5%	7.1%	$p = 0.0000$
I agree	8.4%	16.5%	10.5%	43.4%	
I strongly agree	2.2%	7.0%	7.4%	20.3%	

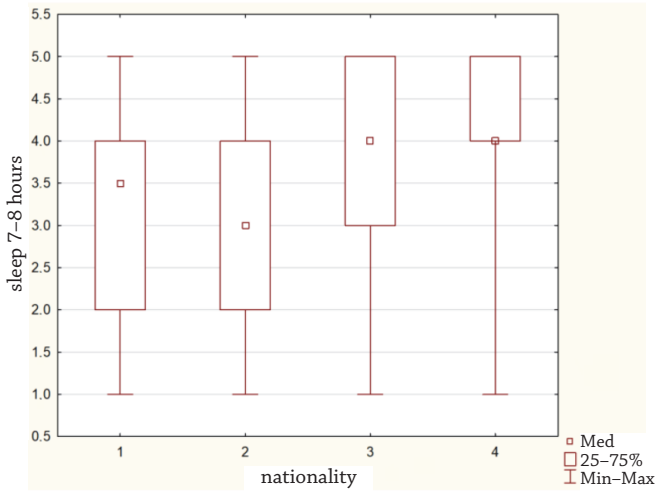

Fig. 1. Sleep length by nationality

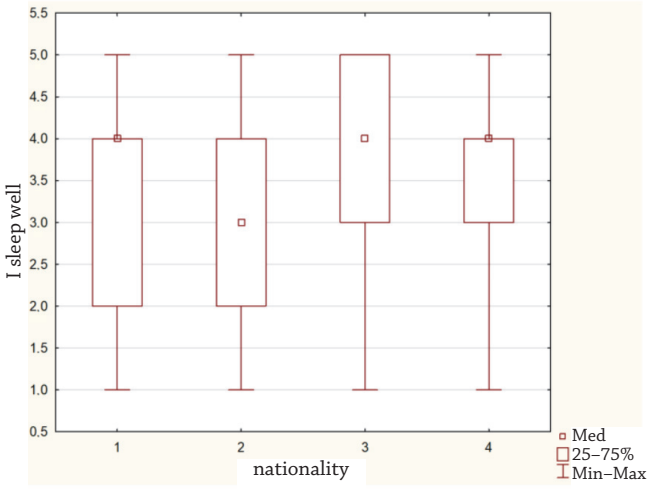

Fig. 2. Quality of sleep by nationality

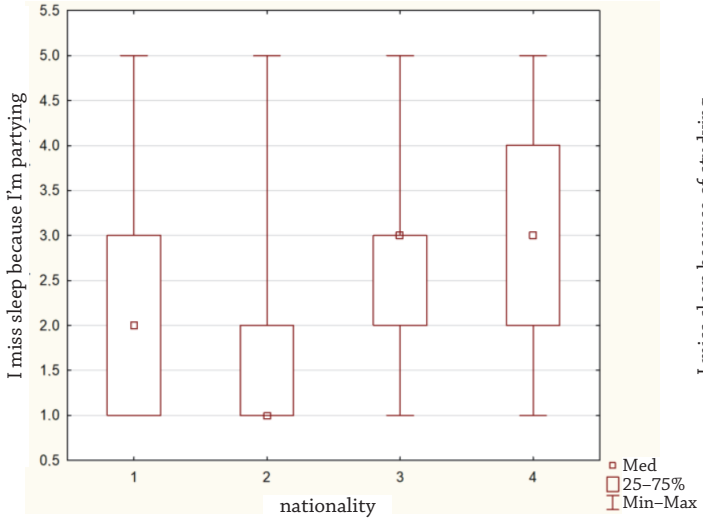

Fig. 3. Miss sleeping due to nationality

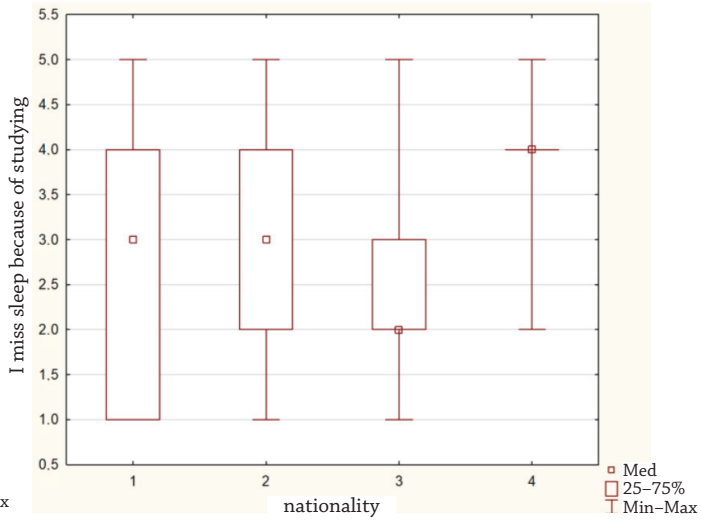

Fig. 4. Miss sleeping due to night study by social life by nationality

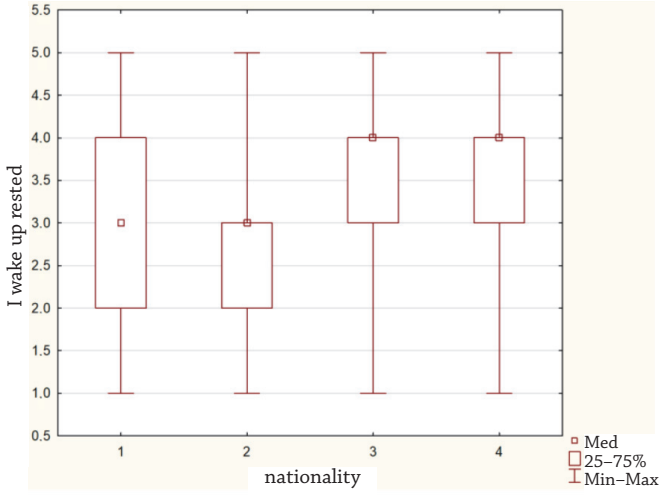

Fig. 5. Feeling rested in the morning by nationality

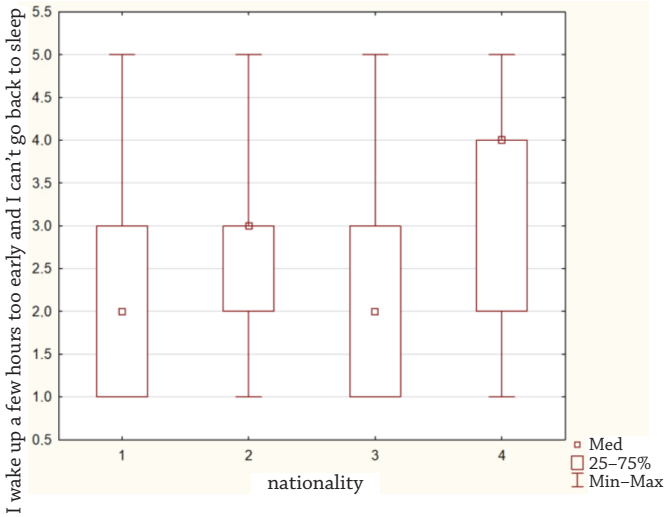

Fig. 6. The problem of waking up and falling asleep again by nationality

Key: 1.0 strongly disagree; 2.0 disagree; 3.0 neither agree nor disagree; 4.0 agree; 5.0 strongly agree. 1 Poland; 2 Hungary; 3 Greece; 4 Turkey.

Discussion

Sleep is vital to health, mood, cognitive performance, work quality and social life (Aledavood et al., 2019; Garbarino et al., 2016; Golder and Macy, 2011; Holbein et al., 2019). It is an important part of people's overall health, especially the young. It affects the body, mind, and thus quality of life. Adequate quality and length of sleep are necessary to maintain optimal physical health, and to reduce the risk of developing diseases of civilization, such as cardiovascular disease (Galan-Lopez et al., 2021).

The presented results confirm the well-known and recently frequently described problem of high prevalence of sleep disorders and improper sleep hygiene. This problem is no longer the domain of only patients treated for specific disorders causing sleep problems (Kasperczyk and Jośko, 2012).

The causes of sleep disorders in young people are usually not medical, but mundane problems such as improper sleep hygiene, bad habits, disregard for rest, or stress and personal problems. These problems are quite different from those in the "adult" world, and consequently they are often neglected by parents or caregivers (Ohayon et al., 2000; Szelenberger, 2007; Wolfson and Carskadon, 2003). This lack of understanding only exacerbates existing problems, and sleep disorders can progress to chronic conditions. The effects of sleep disorders in adolescence are somewhat less measurable, but attention is drawn to poorer academic performance, and less involvement in university responsibilities (Blunden and Chervin, 2008; Gaultney, 2010; Kasperczyk and Jośko, 2007; Millman, 2005; Pracka et al., 2003; Wolfson and Carskadon, 2003). In the future, the effect of this may be that, in addition to sleep disorders transitioning to a chronic state, these individuals will have a worse, lower-paid job, and a higher risk of developing diseases related to sleep disorders. Problems with sleep quality in students can also be seen in reports of other authors. Sierra et al. (2002) show that approximately 30% of the sample has a low sleep quality, poor sleep efficiency, and excessive latency. These results suggest that difficulties in falling asleep characterize poor sleep quality, especially in younger subjects.

The results of studies suggest that there are cultural differences in sleep quality and sleep hygiene practices, and that sleep hygiene practices are important in relation to the sleep quality of adolescents and young people (LeBourgeois et al., 2004).

The literature shows a relationship between sleep quality and academic performance (Jalali et al., 2020; Okano et al., 2019). Although our study did not examine these relationships, it can be seen that students not only have a social life in the evenings, but are also much more likely to spend their evenings studying to improve or maintain positive results. At this point, one might wonder whether the excessive study load causes students to have to prepare for the next day's classes instead of resting at night.

The authors of the present study have not encountered reports from other researchers comparing the sleep quality of students from different countries. The literature on the subject reveals some differences between countries, suggesting that cultural values, local conditions, and the environment all influence sleep practices and attitudes (Jahrami et al., 2020). However, the conclusions presented are general, and difficult to relate to the findings we obtained. The present comparative study indicates that students from Hungary have the worst sleep quality, while those from Turkey have the best. Perhaps geographical location is one of the factors affecting sleep quality, as research shows that the closer you live to the equator the more inclined you are to go to bed early and wake up at dawn. According to Brazilian researchers, the main factor determining the times of getting up and falling asleep is geographical location. It may be worthwhile to take these relationships into account when arranging classes for international students from other geographic regions (Korczak et al., 2008).

Limitations

The conducted research provides important knowledge, but it is also subject to several limitations. The authors focused on only one variable – country of origin, and not other variables that might affect sleep quality, such as like sleep environment (place of sleeping, bedding, temperature, light), general health condition, lifestyle, the course of study, etc. Another limitation was that the study sample was limited to four countries only. Among the socio-cultural factors characterising the respondents, only their country of origin was included.

Another limitation may be the period at which the study was conducted (2015–2016). The authors recognize that the current situation is now different – in light of the SARS-CoV-2 pandemic (Anwer et al., 2021; Benham, 2020; Florea et al., 2021). Therefore, the quality of sleep is probably different from that presented in our study. However, it is worth remembering that at any time – before, during, or after a pandemic – sleep quality is an important part of maintaining and preserving health.

Conclusions

Most students evaluate the quality of sleep well and sleep the recommended 7–8 hours. The longest sleepers are Greek students, who wake up feeling well rested but also tend to wake up too early. The shortest sleepers are Hungarian students. Approximately 30% of students from Turkey miss sleep due to studying or socializing, and they also wake up during the night and have trouble falling asleep again. More often than other nations, Polish students do not sleep at night because of their social life.

Sleep hygiene, its quality and quantity are often underestimated. Catching up on work from university or having fun is prioritised over sleep. On the one hand, these are permanent elements characteristic of the lifestyle of young people. On the other hand, lack of care for a good night's rest affects quality of life, efficiency of learning, and physical and mental condition, leading to permanent sleep problems.

The differences between countries suggest that interventions aimed at improving sleep should be culturally adapter. Issues related to sleep and its difficulties are not only related to the sphere of private, individual life. They should be a contribution to the discussion on constructing educational programmes and planning the course of studies. Study time should be balanced with work time and relaxation time.

Author contributions

ML-S: conceptualization, methodology, software, validation, formal analysis, investigation, resources, data curation, project administration. ML-S and MN: writing and editing, visualization, supervision, funding acquisition. All authors have read and agreed to the published version of the manuscript.

Funding

This research received no external funding.

Institutional review board statement
The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by The Bioethics Committee of the Regional Chamber of Physicians and Dentists in Gdansk (No: KB-15/16).

Data availability statement
The data analysed in this study are available from the first author.

Acknowledgements
We would like to thank all of the participants who voluntarily took part in the research.

Ethical aspects and conflict of interests
The authors have no conflict of interests to declare.

Kvalita spánku vysokoškolských studentů: multicentrická studie

Souhrn
Úvod: Spánek je důležitou součástí životního stylu, ovlivňuje jeho kvalitu a promítá se do efektivity činností během dne. Špatná kvalita spánku může vést k fyzickým, psychickým a sociálním poruchám. Spánek je považován za sociologický, antropologický a kulturní fenomén. Cílem této studie bylo porovnat kvalitu spánku studentů z různých zemí.
Metodika: Výzkumný soubor tvořilo 532 polských, tureckých, maďarských a řeckých studentů v období od prosince 2016 do března 2017. Bylo použito diagnostické šetření a technika dotazníku. Odkaz na online dotazník byl studentům zaslán prostřednictvím internetu nebo zpřístupněn v tištěné podobě. Názory studentů byly měřeny pomocí pětibodové Likertovy škály.
Výsledky: Data ukázala, že většina studentů spí dobře, ale mají bezesné noci kvůli studiu a společenskému životu, vstávají bez spánku a budí se brzy. Hloubková analýza ukázala statistickou významnost mezi studovanými složkami spánku studentů a jejich zemí původu: délka a kvalita spánku, usínání kvůli studiu a společenskému životu, pocit ranního odpočinku a problém s probouzením a usínáním.
Závěr: Významné rozdíly byly zjištěny ve spánkových vzorcích studentů různých národností. Otázky související se spánkem a jeho problémy by měly být diskutovány v organizacích a osobami odpovědnými za vytváření vzdělávacích programů a plánování studií.

Klíčová slova: kulturní rozdíly; kvalita spánku; student

References

1. Airhihenbuwa CO, Iwelunmor JI, Ezepue CJ, Williams NJ, Jean-Louis GI (2016). Sleep, because we sleep: a synthesis on the role of culture in sleep behavior research. Sleep Med 18: 67–73. DOI: 10.1016/j.sleep.2015.07.020.
2. Aledavood T, Torous J, Hoyos AMT, Naslund JA, Onnela J-P, Keshavan M (2019). Smartphone-based tracking of sleep in depression, anxiety, and psychotic disorders. Curr Psychiatry Rep 21(7): 1–9. DOI: 10.1007/s11920-019-1043-y.
3. Anwer S, Li H, Antwi-Afari MF, Shaphe MA, Alghadir A, Wong AYL (2021). Evaluation of Sleep Habits, Generalized Anxiety, Perceived Stress, and Research Outputs Among Postgraduate Research Students in Hong Kong During the Coronavirus (COVID-19) Pandemic. J Multidiscip Healthc 14: 3135–3149. DOI: 10.2147/JMDH.S325479.
4. Benham G (2020). Stress and sleep in college students prior to and during the COVID-19 pandemic. Stress Health 37: 504–515. DOI: 10.1002/smi.3016.
5. Bhatnagar M, Chittora R (2018). Sleep is for Life: an Essential Part of Everyday Life. On J Neur & Br Disord 1(4). DOI: 10.32474/OJNBD.2018.01.000118.
6. Blunden SL, Chervin RD (2008). Sleep problems are associated with poor outcomes in remedial teaching programmes: A preliminary study. J Paediatr Child Health 44(5): 237–242. DOI: 10.1111/j.1440-1754.2007.01237.x.
7. Buxton OM, Marcelli E (2010). Short and long sleep are positively associated with obesity, diabetes, hypertension, and cardiovascular disease among adults in the United States. Soc Sci Med 71(5):1027–1036. DOI: 10.1016/j.socscimed.2010.05.041.
8. Cheung BY, Takemura K, Ou C, Gale A, Heine SJ (2021). Considering cross-cultural differences in sleep duration between Japanese and Canadian university students. PLoS One 16(4): e0250671. DOI: 10.1371/journal.pone.0250671.
9. Doolin J, Vilches JE, Cooper C, Gipson C, Sorensen W (2018). Perceived stress and worldview influence sleep quality in Bolivian and United States university students. Sleep Health 4(6): 565–571. DOI: 10.1016/j.sleh.2018.08.006.
10. Eyre H, Kahn R, Robertson RM (2004). Preventing cancer, cardiovascular disease, and diabetes: a common agenda for the American Cancer Society, the American Diabetes Association, and the American Heart Association. Diabetes Care 27(7): 1812–1824. DOI: 10.2337/diacare.27.7.1812.
11. Florea C, Topalidis P, Hauser T, Angerer M, Kurapov A, Brandão S, et al. (2021). Sleep during COVID-19 lockdown: A cross-cultural study investigating job system relevance. Biochem Pharmacol 191: 114463. DOI: 10.1016/j.bcp.2021.114463.
12. Fonseca AG, Genzel L (2020). Sleep and academic performance: considering amount, quality and timing. Curr Opin in Behav Sci 33: 65–71. DOI: 10.1016/j.cobeha.2019.12.008.
13. Friedrich A, Schlarb AA (2018). Let's talk about sleep: a systematic review of psychological interventions to improve sleep in college students. J Sleep Res 27(1): 4–22. DOI: 10.1111/jsr.12568.
14. Galan-Lopez P, Dominguez R, Gisladottir T, Sanchez-Oliver AJ, Pihu M, Ries F, et al. (2021). Sleep Quality and Duration in European Adolescents (The AdolesHealth Study): A Cross-Sectional, Quantitative Study. Children (Basel) 8(3): 188. DOI: 10.3390/children8030188.
15. Garbarino S, Lanteri P, Durando P, Magnavita N, Sannita WG (2016). Co-morbidity, mortality, quality of life and the healthcare/welfare/social costs of disordered sleep: a rapid review. Int J Environ Res Public Health 13(8): 831. DOI: 10.3390/ijerph13080831.
16. Gaultney JF (2010). The prevalence of sleep disorders in college students: impact on academic performance. J Am Coll Health 59(2): 91–97. DOI: 10.1080/07448481.2010.483708.
17. Golder SA, Macy MW (2011). Diurnal and seasonal mood vary with work, sleep, and daylength across diverse cultures. Science 333(6051): 1878–1881. DOI: 10.1126/science.1202775.

18. Hale L, Troxel W, Buysse DJ (2020). Sleep Health: An Opportunity for Public Health to Address Health Equity. Annu Rev Public Health 41: 81–99. DOI: 10.1146/annurev-publhealth-040119-094412.
19. Holbein JB, Schafer JP, Dickinson DL (2019). Insufficient sleep reduces voting and other prosocial behaviours. Nat Hum Behav 3(5): 492–500. DOI: 10.1038/s41562-019-0543-4.
20. Jahrami H, Dewald-Kaufmann J, Faris MAI, AlAnsari AMS, Taha M, AlAnsari, N (2020). Prevalence of sleep problems among medical students: a systematic review and meta-analysis. J Public Health (Berl.) 28(5): 605–622. DOI: 10.1007/s10389-019-01064-6.
21. Jalali R, Khazaei H, Paveh BK, Hayrani Z, Menati L (2020). The Effect of Sleep Quality on Students' Academic Achievement. Adv Med Educ Pract 11: 497–502. DOI: 10.2147/AMEP.S261525.
22. Jeon M, Dimitriou D, Halstead EJ (2021). A Systematic Review on Cross-Cultural Comparative Studies of Sleep in Young Populations: The Roles of Cultural Factors. Int J Environ Res Public Health 18(4): 2005. DOI: 10.3390/ijerph18042005.
23. Kasperczyk J, Jośko J (2007). The estimation of sleep quality by means of SEN questionnaire. In: Kaczor A, Borzęcki A, Iskra M (Eds). Środowiskowe źródła zagrożeń zdrowotnych., Lublin: Polihymnia, pp. 225–227.
24. Kasperczyk J, Jośko J (2012). The analysis of factors responsible for poor sleep quality in Silesian Medical School students. Hygeia Public Health 47(2): 191–195.
25. Korczak AL, Martynhak BJ, Pedrazzoli M, Brito AF, Louzada FM (2008). Influence of chronotype and social zeitgebers on sleep/wake patterns. Braz J Med Biol Res 10(41): 914–919. DOI: 10.1590/s0100-879x2008005000047.
26. LeBourgeois MK, Giannotti F, Cortesi F, Wolfson A, Harsh J (2004). Sleep hygiene and sleep quality in Italian and American adolescents. Ann N Y Acad Sci 1021: 352–354. DOI: 10.1196/annals.1308.044.
27. Lemma S, Berhane Y, Worku A, Gelaye B, Williams MA (2014). Good quality sleep is associated with better academic performance among university students in Ethiopia. Sleep Breath 18(2): 257–263. DOI: 10.1007/s11325-013-0874-8.
28. Lund HG, Reider BD, Whiting AB, Prichard JR (2010). Sleep patterns and predictors of disturbed sleep in a large population of college students. J Adolesc Health 46(2): 124–132. DOI: 10.1016/j.jadohealth.2009.06.016.
29. Mah CD, Kezirian EJ, Marcello BM, Dement WC (2018). Poor sleep quality and insufficient sleep of a collegiate student-athlete population. Sleep Health 4(3): 251–257. DOI: 10.1016/j.sleh.2018.02.005.
30. Marques DR, Meia-Via AMS, da Silva CF, Gomes AA (2017). Associations between sleep quality and domains of quality of life in a non-clinical sample: results from higher education students. Sleep Health 3(5): 348–356. DOI: 10.1016/j.sleh.2017.07.004.
31. Mattingly SM, Grover T, Martinez GJ, Aledavood T, Robles-Granda P, Nies K, et al. (2021). The effects of seasons and weather on sleep patterns measured through longitudinal multimodal sensing. NPJ Digit Med 4(1): 76. DOI: 10.1038/s41746-021-00435-2.
32. Millman RP (2005). Excessive Sleepiness in Adolescence and Young Adults: Causes, Consequences, and Treatment Strategies. Pediatrics 115(6): 1774–1786. DOI: 10.1542/peds.2005-0772.
33. Naderifar M, Goli H, Ghaljaie F (2017). Snowball sampling: A purposeful method of sampling in qualitative research. Strides Dev Med Educ 14(3): e67670. DOI: 10.5812/sdme.67670.
34. NHLBI – National Heart, Lung, and Blood Institute (2022). Sleep Deprivation and Deficiency. Why Is Sleep Important? [online] [cit. 2021-05-11]. Available from: https://www.nhlbi.nih.gov/health-topics/sleep-deprivation-and-deficiency
35. Ohayon M, Roberts RE, Zulley J, Smirne S, Priest RG (2000). Prevalence and patterns of problematic sleep among older adolescents. J Am Acad Child Adolesc Psychiatry 39: 1549–1556. DOI: 10.1097/00004583-200012000-00019.
36. Okano K, Kaczmarzyk JR, Dave N, Gabrieli JDE, Grossman JC (2019). Sleep quality, duration, and consistency are associated with better academic performance in college students. NPJ Sci Learn 4(16). DOI: 10.1038/s41539-019-0055-z.
37. Patel NP, Grandner MA, Xie D, Branas C, Goonerate N (2010). "Sleep disparity" in the population: poor sleep quality is strongly associated with poverty and ethnicity. BMC Public Health 10: 475. DOI: 10.1186/1471-2458-10-475.
38. Pracka D, Pracki T, Nadolska M, Ciesielczyk K, Ziółkowska-Kochan M, Tafil-Klawe M, et al. (2003). Epidemiologiczna ocena zmian jakości snu w wybranych grupach społecznych i wiekowych. Sen 3(4): 139–144.
39. Sa J, Choe S, Cho B, Chaput J-P, Kim G, Park C-H, et al. (2020). Relationship between sleep and obesity among U.S. and South Korean college students. BMC Public Health 20(96). DOI: 10.1186/s12889-020-8182-2.
40. Schlarb AA, Friedrich A, Classen M (2017). Sleep problems in university students – an intervention. Neuropsychiatr Dis Treat 13: 1989–2001. DOI: 10.2147/NDT.S142067.
41. Sierra JC, Jiménez-Navarro C, Martín-Ortiz DJ (2002). Quality of sleep in university students: The importance of sleep hygiene. Salud Mental 25(6): 35–43.
42. Stenberg D (2007). Neuroanatomy and neurochemistry of sleep. Cell Mol Life Sci 64(10): 1187–1204. DOI: 10.1007/s00018-007-6530-3.
43. St-Onge M-P, Grandner MA, Brown D, Conroy MB, Jean-Louis G, Coons M, Bhatt DL (2016). Sleep duration and quality: impact on lifestyle behaviors and cardiometabolic health: a scientific statement from the American Heart Association. Circulation 134(18): e367–e386. DOI: 10.1161/CIR.0000000000000444.
44. Szelenberger W (2007). Bezsenność. Gdańsk: Via Medica, p. 98.
45. Tafforeau J, Cobo ML, Tolonen H, Scheidt-Nave C, Tinto A (2005). Guidelines for the Development and Criteria for the Adoption of Health Survey Instruments [online] [cit. 2021-05-26]. Available from: https://ec.europa.eu/health/ph_information/dissemination/reporting/ healthsurveys_en.pdf
46. Watson NF, Badr MS, Belenky G, Bliwise DL, Buxton OM, Buysse D, et al. (2015). Recommended amount of sleep for a healthy adult: a joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society. Sleep 38(6): 843–844. DOI: 10.5665/sleep.4716.
47. Williams NJ, Grandne MA, Snipes SA, Rogers A, Williams O, Airhihenbuwa C, Jean-Louis G (2015). Racial/ethnic disparities in sleep health and health care: importance of the sociocultural context. Sleep Health 1(1): 28–35. DOI: 10.1016/j.sleh.2014.12.004.
48. Wolfson AR, Carskadon MA (2003). Understanding adolescents' sleep patterns and school performance: a critical appraisal. Sleep Med Rev 7(6): 491–506. DOI: 10.1016/s1087-0792(03)90003-7.
49. Wondie T, Molla A, Mulat H, Damene W, Bekele M, Madoro D, Yohannes K (2021). Magnitude and correlates of sleep quality among undergraduate medical students in Ethiopia: cross-sectional study. Sleep Science Practice 5(7). DOI: 10.1186/s41606-021-00058-2.