



## Sleep Beliefs and Circadian Typology of Helping Professions Students

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### ABSTRACT

The aim of this study was to evaluate sleep beliefs in students of helping professions and to explore differences in sleep beliefs considering circadian typology. We have also investigated the relationship between sleep beliefs, self-assessment of awareness of healthy sleep recommendations and self-assessment of sleep quality. Moreover we have investigated the relationship of circadian typology with assessment of awareness of recommendations for healthy sleep and assessment of one's own sleep quality. This study was conducted online among 563 students from seven different study programmes of helping professions at the University of Zagreb, Croatia. Sleep beliefs were examined with Sleep Beliefs Scale (Adan et al., 2006) and circadian typology with Composite Scale of Morningness (Smith et al., 1989). The average percentage of correct sleep beliefs in helping professions students was 61%. The results showed low positive correlation between correctness of sleep beliefs and one's own assessment of awareness of healthy sleep recommendations. Greater self assessed sleep quality was associated with greater tendency toward morningness. The differences in the accuracy of sleep beliefs between students of different circadian typology was not found, neither was the correlation between accuracy of sleep beliefs and assessment of one's own sleep quality, nor the correlation between circadian typology dimension and assessment of awareness of healthy sleep recommendations. The results of our study implicate that university students, even those with some formal education on sleep physiology and psychology, could benefit from sleep hygiene education programs, both personally and professionally.

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#### Keywords:

Sleep beliefs, circadian typology, sleep hygiene, sleep quality

### Introduction

Student life comes with countless new and stressful challenges, such as increased freedom and responsibility, managing own lifestyle, sudden changes in timetables, countless deadlines and an increase of academic and social duties (Buboltz, Soper, Brown, & Jenkins, 2002). Previous studies found that over 70% of students report dissatisfaction or occasional problems with sleep (Buboltz, Brown, & Soper, 2001; Hicks, Fernandez, & Pellegrini, 2001) which is important because sleep difficulties during late adolescence predict sleep difficulties in adulthood (Dregan, & Armstrong, 2010) and it is estimated that 25% of students have a risk of developing a sleep disorder (Gaultney, 2010). Especially during the exam period, academic responsibilities may require studying during the night and prolong light exposure due to computer use, which may disrupt the regulation of circadian rhythms and contribute to irregular sleep patterns and low sleep quality (Voelker, 2004). Additionally, social interactions with peers may delay bedtime (Brown, Buboltz, & Soper, 2002). Sleep problems and consequential difficulties during the day are risk factors for many problems in students, such as poor mental and physical health (Lund, Reider, Whiting, & Prichard, 2010; Pilcher, Ginter, & Sadowsky, 1997; Steptoe, Peacey, & Wardle, 2006; Taylor et al., 2011b), decreased academic performance (Gaultney, 2010) and impaired attention (Pilcher, & Walters, 1997). Also, researches

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showed that sleep deprivation leads to lower cognitive (Pilcher, & Walters, 1997; Taylor, & McFatter, 2003; Yang et al., 2008) and academic performance (Tsai, & Li, 2004).

The majority of students show pronounced eveningness delaying their sleep timing (Carskadon, Acebo, & Jenni, 2004). Evening type students may have a greater risk for sleep difficulties and disorders due to incongruence of their preferred bedtime and wake time and societal demands, which is supported with studies that found that evening type students report higher levels of tiredness (Taylor, Clay, Bramoweth, Sethi, & Roane, 2011a), poorer daily functioning (Selvi et al., 2012), greater daily sleepiness, higher perceived sleep debt and more difficulties with falling asleep (Fernández-Mendoza et al., 2010). Also, evening type students have lower sleep quality (Bavarsad, Azimi, Moradbeigi, & Latifi, 2015; Digdon, 2010; Fernández-Mendoza et al., 2010; Lima, Varela, Silveira, Parente, & Araujo, 2010; Medeiros, Mendes, Lima, & Araujo, 2001; Selvi et al., 2012; Voinescu, & Szentagotai-Tatar, 2015) and unrefreshing sleep (Fernández-Mendoza et al., 2010). Previous studies have found that evening type students had lower academic performance than morning type students (Beşoluk, Önder, & Deveci, 2011; Gomes, Tavares, & Azevedo, 2002; Taylor et al., 2011a), that eveningness was associated with academic procrastination (Hess, Sherman, & Goodman, 2000), that evening types reported weaker memory abilities (Fernández-Mendoza et al., 2010) and that greater eveningness was associated with lower life satisfaction (Jankowski, 2012).

In addition to the natural shift towards eveningness, an increase in responsibilities contributes to the risk for sleep problems in students as well. To avoid negative outcomes of low sleep quality on students' education and future career, well-being, life satisfaction, and mental and physical health during and after the period of enrollment in higher education, it is necessary to increase their sleep hygiene awareness and to help them adopt strategies for improving their sleep. One of the possible ways to improve their sleep is sleep hygiene interventions, which include recommendations that are commonly a part of education programmes about sleep related topics. Sleep hygiene refers to general behavioural rules and rules about arranging external factors in terms of promoting sleep quality, ensuring sufficient length of sleep and promoting optimal wakefulness (American Academy of Sleep Medicine, 2005; Yang, Lin, Hsu, & Cheng, 2010). Studies have found a positive association between adherence to sleep hygiene recommendations and sleep quality in student populations (Brick, Seely, & Palermo, 2010; Brown et al., 2002; Mastin, Bryson, & Corwyn, 2006; Suen, Tam, & Hon, 2010). The studies on the effectiveness of sleep education programmes in students show improvements in their sleep quality (Asano et al., 2015; Brown, Buboltz, & Soper, 2006; Orzech, Salafsky, & Hamilton, 2011; Trockel, Manber, Chang, Thurston, & Taylor, 2011), earlier bedtimes, a decrease in sleep latency and an increase in the total amount of sleep (Orzech et al., 2011). On the other hand, some studies have not confirmed that sleep education programmes were significantly effective (Agagianian, 2014; Olsen, 2014; Tsai, & Li, 2004).

The knowledge about sleep hygiene recommendations is also termed "sleep beliefs" by several authors (Adan, Fabbri, Natale, & Prat, 2006; Díaz-Morales, Prieto, Brreno, Mateo, & Randler, 2012; Voinescu, Coogan, & Orăsan, 2010a). Studies have found that the average percentage of correct sleep beliefs was 59% in healthy adults and in adults with a diagnosis of major depression (Voinescu et al., 2010a), 49% in adolescents (Díaz-Morales et al., 2012), and 69% in students (Adan et al., 2006). Sleep education programmes for adolescents and students, which also included sleep beliefs modifications, have discovered an increase in the amount of correct sleep beliefs and in the knowledge about sleep processes (Azevedo et al., 2008; Bakotić, Radošević-Vidaček, & Koščec, 2009; Cain, Gradisar, & Moseley, 2011; Cortesi, Giannotti, Sebastiani, Bruni, & Ottaviano, 2004; Díaz-Morales et al., 2012; Kloss et al., 2014; Quan, Anderson, & Hmodge, 2013; Sousa, Souza, Louzada, & Azevedo, 2013; Vollmer et al., 2014). Previous studies have found a weak, but positive correlation between the percentage of correct sleep beliefs and adherence to sleep hygiene recommendations in students (Brown et al., 2002; Hicks, Lucero-Gorman, Bautista, & Hicks, 1999; Suen, Ellis Hon, & Tam, 2008) just like it was found in adults (Gallasch, & Gradisar, 2007). The association between sleep quality and sleep beliefs is not clear. Some studies have found that people with more correct beliefs report better sleep quality (Gallasch, & Gradisar, 2007; Voinescu et al., 2010a) and greater length of sleep and sleep efficacy, and shorter sleep latency (Voinescu et al., 2010a). On the other hand, Voinescu and Szentagotai-Tatar (2015) found a low negative correlation between the number of correct sleep beliefs and sleep quality. However, Brown et al. (2002) conducted a study on a student sample and, similarly as Gallasch and Gradisar (2007), concluded that sleep beliefs were not necessarily correlated with sleep quality when factors that affect sleep

quality were controlled for (age, gender and sleep beliefs). Their additional analysis showed that adherence to sleep hygiene recommendation was a mediator between sleep beliefs and sleep quality.

Some of the individual differences that can moderate the effectiveness of sleep education programmes and possibly even sleep beliefs themselves are differences in circadian typology. In studies by Adan et al. (2006) and by Díaz-Morales et al. (2012), morning type adolescents and university students had more correct sleep beliefs than intermediate or evening type students. However, Voinescu et al. (2010a) did not find a difference in sleep beliefs among groups with different circadian typology, not even in people with major depression diagnosis, neither in the control sample, nor in the sample of adults aged between 18 and 65 (Voinescu, & Szentagotai-Tatar, 2015), or in the sample of psychology students (Digdon, 2010). Yet, some studies of sleep hygiene and circadian typology found that greater eveningness was associated with less adherence to sleep hygiene recommendations on a sample of workers (Barber, Grawitch, & Munz, 2013), and on a sample of students aged 12 and 13 (Cain et al., 2011; Vollmer et al., 2014). Low sleep quality was associated with more pronounced eveningness, and this association was mediated by adherence to sleep hygiene recommendations (Chung, Liu, Lee, & Hsu, 2013). Díaz-Morales et al. (2012) examined the effects of sleep education programme and found that evening type adolescents have more correct beliefs than morning type adolescents, and that the average percentage of correct beliefs had increased in relation to a control group of adolescents that did not participate in education. The studies on association of sleep beliefs and circadian typology implicate that evening types, especially students, may be a vulnerable population with a potentially low sleep hygiene and consequentially low sleep quality, in addition to all sleep difficulties typical for this population that were described previously.

The aim of this study was to test the differences in correctness of sleep beliefs in relation to circadian typology and to estimate the correctness of sleep beliefs in students of helping professions. To further explore the importance of circadian dimension in understanding sleep beliefs, we examined the association of circadian typology with sleep quality and with self-estimated knowledge about healthy sleep recommendations. Although there are several studies on sleep beliefs in students of psychology (Adan et al., 2006; Voinescu, & Szentagotai-Tatar, 2015), to our knowledge there is no study that included students of different helping professions. In order to create efficient sleep education programmes for helping professions students and to understand the sleep beliefs results on this sample, it is necessary not only to estimate sleep beliefs, but also to determine the relationship between the actual number of correct sleep beliefs and student's estimation of the accuracy of his knowledge about sleep hygiene recommendations. Additionally, we raised the question on the relationship between sleep beliefs and sleep quality in a sample of students of helping professions who potentially could and/or should have been educated about sleep in their basic study programmes at the university.

## Methods

### Participants

The study included 563 students from seven different helping professions programmes at the University of Zagreb in Croatia (Study of Educational Rehabilitation, Study of Speech and Language Pathology, Study of Social Pedagogy, Study of Psychology, Study of Medicine, Study of Social Work, Study of Primary School Education). Most of the participants were females ( $n = 504$  (89.5%)) and the average age was 21, with a range from 18 to 32 ( $M = 21.36$ ,  $SD = 2.15$ ). Due to somewhat atypical age range in this sample and due to the fact that morningness-eveningness depends on age, we verified the distribution of morningness-eveningness results with Kolmogorov-Smirnov test. We found no difference in the distributions when participants of untypical age were excluded ( $KSz = 0.065$ ;  $p < .01$  and  $KSz = 0.066$ ;  $p < .01$ ), therefore, we did not exclude outliers from further data analysis.

### Instruments

**Sleep beliefs scale (SBS).** Sleep belief scale is authored by Adan, Fabbri, Natale and Prat (2006) and it is used to measure the knowledge about sleep hygiene recommendations (i.e. recommendations for healthy sleep). It is based on the *Sleep Hygiene Awareness* scale by Lacks and Rotert (1986), but it includes additional questions about sleep related behaviours. SBS is a 20-item scale, used to determine awareness of behaviours related to falling asleep, sleep schedule, use of various psychoactive substances (e.g. alcohol, caffeine,

nicotine, sleep medications), daytime behaviours (e.g. physical activity and additional sleep), and of behaviours and mental states before bedtime (e.g. eating, studying, worrying). The results reveal the amount of incorrect sleep beliefs based on participants' estimates whether various behaviours and thoughts have positive, negative or null effect on sleep quality and duration. A correct answer is scored with 1 point, while an incorrect answer is scored with 0. *Negative effect* is the correct answer for all items besides the following: *Sleeping in a quiet and dark room*, *Diverting one's attention and relaxing before bedtime*, *Going to bed and waking up always at the same hour* and *Getting up when it is difficult to fall asleep*. Total scores can range between 0 and 20, with greater score suggesting more correct sleep beliefs. Previous studies found that the reliability of this scale was acceptable or good;  $\alpha_c = .71$  on a student sample (Adan et al., 2006),  $\alpha_c = .66$  on a sample of depressive participants and on a control sample (Voinescu et al., 2010a), and  $\alpha_c = .59$  on a sample of adolescents (Díaz-Morales et al., 2012).

The original English version of the scale was retrieved from the authors Adan et al. (2006). The translation from English to Croatian was done by two final-year psychology students and a psychologist, fluent in English, expert in sleep and circadian rhythm research. After the consensus on the initial version of the translation into Croatian was reached between the co-authors, the scale was sent to back translation to another final-year psychology student and two other psychologist, experts in sleep and circadian rhythm research, fluent in English. The final version of Croatian translation was formed by consensus of the co-authors on different back-translations comparing it with the original version of the scale. Parallel-blind translation method was used for both steps. The reliability of the scale in this study was  $\alpha_c = .62$ .

**The composite scale of morningness (CSM).** This scale measures morningness-eveningness dimension (Smith, Reilly, & Midkiff, 1989) and consists of 13 items related to preferred wake time and bedtime, ease of waking up, preference for activities at various times of day, time needed to achieve full wakefulness, and self-estimate on the dimension of morningness-eveningness. Total scores can range from 13 ("extreme eveningness") to 55 ("extreme morningness"). The categorization in circadian types was based on the criteria used in Voinescu, Coogan, Thome and Orăsan (2010b). The participants whose results were  $\leq$  25th percentile were categorized as evening types, the participants whose results were between 24th and 75th percentile were categorized as intermediate types, while those whose results were  $\geq$  75th percentile were categorized as morning types. Studies from different countries found reliabilities between  $\alpha_c = .65$  and  $\alpha_c = .91$  (Caci et al., 2005). This study found a high reliability of CSM ( $\alpha_c = .87$ ). The authors of Croatian translation of the CSM (Bakotić et al., in press) reported the same reliability coefficient  $\alpha_c = .87$  obtained on a sample of 877 students of the University of Zagreb from six different scientific fields (biomedicine, biotechnology, natural sciences, social sciences and humanities).

**Other measures.** Data about sleep quality and self-estimated knowledge of recommendations for healthy sleep was collected with items "How would you estimate your sleep quality?", and "How would you estimate your knowledge of healthy sleep?" These items were constructed for the purposes of this study and theoretical range of the responses was 1 to 5 (*very bad* to *very good*). Questions about age, gender and university (i.e. type of programme and year of study) were asked as well.

## Procedure

The data for this study were collected online. The link for the study was posted twice in e-mail groups and in private social network groups related to students from various faculties with helping professions programmes. The data had been collected for two weeks in December 2014. The participants were informed about the topic and aim of the study, and were guaranteed anonymity and voluntary basis of participation. Additionally, they were given an e-mail address where they could send questions or comments about the study or to express an interest for study results. First the participants' demographic information was collected, which was followed with the SBS, CSM, and measures of quality of sleep and self-estimated knowledge of sleep hygiene recommendations.

## Results

**Table 1.** Percentage of correct responses for all 20 items of sleep beliefs scale

Item	Percentage of correct responses
Sleeping in a quiet dark room	95.6%
Diverting one's attention and relaxing before bedtime	92.4%
Going to bed and waking up always at the same hour	87.7%
Drinking coffee or other substances with caffeine after dinner	86.5%
Taking a long nap during the day	85.3%
Being worried about the impossibility of getting enough sleep	84.9%
Thinking about one's engagements for the next day before falling asleep	75.1%
Studying or working intensely until late night	69.1%
Using sleep medication regularly	64.3%
Going to bed with an empty stomach	55.2%
Using the bed for eating, calling on the phone, studying and other non-sleeping activities	54.7%
Going to bed 2 h later than the habitual hour	52.6%
Going to bed immediately after eating	51.3%
Smoking before falling asleep	47.4%
Doing intense physical exercise before going to bed	46.4%
Drinking alcohol in the evening	45.3%
Going to bed 2 h earlier than the habitual hour	37.1%
Trying to fall asleep without having a sleep sensation	31.8%
Recovering lost sleep by sleeping for a long time	30.2%
Getting up when it is difficult to fall asleep	27.5%

Table 1 shows the percentage of correct answers for each item in SBS. A high percentage of participants answered that sleeping in a quiet and dark room, diverting one's attention and relaxing before bedtime and going to bed and waking up always at the same hour had positive effect on sleep. Similarly, a high percentage of students believed that drinking coffee or other substances with caffeine after dinner, taking a long nap during the day and being worried about the impossibility of getting enough sleep had negative effect on sleep. On the contrary, low percentage of students believed that getting up when it was difficult to fall asleep, recovering lost sleep by sleeping for a long time, trying to fall asleep without having a sleep sensation and going to bed 2 h earlier than the habitual hour had negative effect on sleep (Table 1).

Eleven out of 20 items about sleep belief were answered correctly by only 50% of participants or less. The distribution was significantly skewed to higher values that represented more correct sleep beliefs ( $KSz = 0.09$ ;  $p < .01$ ). The median result on Sleep Beliefs Scale was  $Mdn = 12$  ( $q = 5$ ), while the lowest obtained result was 2 and the highest 20. The average percentage of correct sleep beliefs was 61%.

The average estimate about own knowledge of healthy sleep recommendations was skewed to higher values ( $M = 3.59$ ;  $SD = 0.85$ ) similarly as was the case for average score on SBS. Spearman's rank correlation between self-estimated knowledge of healthy sleep recommendations and the amount of correct sleep beliefs was  $r_s = .11$  ( $p < .01$ ,  $N = 563$ ).

The average score on CSM was  $M = 31.88$ ,  $SD = 6.88$ , while the lowest obtained result was 13 and the highest 52. The distribution was skewed to lower values, which suggest a greater tendency towards eveningness ( $KSz = 0.07$ ;  $p < .01$ ). Spearman's rank correlation between CSM scores and age was not significant ( $r_s = .02$ ;  $p > .05$ ;  $N = 563$ ), neither was the correlation between CSM scores and self-estimated knowledge of healthy sleep recommendations ( $r_s = -.04$ ;  $p > .05$ ;  $N = 563$ ).

The participants estimated their own sleep quality to be slightly above average ( $M = 3.12$ ;  $SD = 1.01$ ). The correlation between self-reported sleep quality and the number of correct sleep beliefs was not significant ( $r_s = .06$ ;  $p > .05$ ;  $N = 563$ ). The Spearman's rank correlation between CSM scores and subjective

sleep quality was positive and statistically significant indicating that greater tendency towards morningness was associated with higher self-reported sleep quality ( $r_s = .33; p < .01; N = 563$ ).

The differences in sleep beliefs among morning, intermediate and evening types was tested with Kruskal-Wallis test.

**Table 2.** The results on the SBS according to circadian typology

Circadian typology	<i>Mdn</i>	<i>Q</i>	<i>N</i>
Morning	12	4	150
Intermediate	12	4	257
Evening	13	4	156
Total	12	5	563

Table 2 demonstrates participants' median values on SBS and corresponding interquartile ranges based on circadian typology. From the Table 2 it is clear that evening types had a slightly higher median score than morning and intermediate types and that interquartile range is the same for all three types. The difference in SBS among students of different circadian typology was tested with Kruskal-Wallis test and statistically significant difference was not found ( $\chi^2(2) = 5.17; p > .05$ ).

### Discussion and Conclusion

Sometimes even misinformed people believe that they understand sleep correctly. In a situation when a person is not informed, sleep beliefs depend on individual differences, preferences, personal and vicarious experiences. Moreover, the exposure to media and internet play an important role in acquiring information and make it almost impossible not to learn something about sleep and well-being. If there is an interest in a certain topic, then people, especially the young ones, can easily acquire information via electronic media. This raises the question of accuracy of the available information and their congruity with the conclusions of the sleep research field. It is considered that students of helping professions should be correctly informed about healthy sleep recommendations as a consequence of their increased interest in human well-being and as a part of their formal university educational programmes. Still, the empirical data does not seem to support these assumptions, because comparisons with previous studies did not imply differences in total number of correct sleep beliefs between various populations (Adan et al., 2006; Voinescu et al., 2010a). The average percentage of correct beliefs in our study suggests that the students of helping professions do not have very accurate beliefs about sleep, but they also accurately estimate that their knowledge is not very big. Among sleep beliefs studies, there are similarities in the frequency of recognizing the effects of some behaviours on sleep. Most of the participants in our study and most of the participants in other studies correctly estimated that sleeping in a dark room had positive effect on sleep, while drinking coffee and other caffeine drinks after dinner had negative effect on sleep (Adan et al., 2006; Díaz-Morales et al., 2012; Voinescu et al., 2010a). Furthermore, a similarly high percentage of participants correctly answered that compensating lost sleep with longer sleep hours had negative effect, while only a low percentage of them correctly answered that trying to fall asleep without having a sleep sensation affected sleep negatively. It is possible that people from specific populations and countries more commonly think that certain sleep beliefs are correct or incorrect. Thus, it is also possible that a higher frequency of some correct sleep beliefs is due to the fact that they are well-known in the participants' population, which could be the case for beliefs that good conditions in the surroundings and abstinence from caffeine late at night have beneficial effect on sleep. However, it is also possible that this is a consequence of participants' personal experiences or of experiences of people from their close environment when sleep hygiene recommendations were not followed and it disrupted the usual sleep quality.

In this study did not find the differences in accuracy of sleep beliefs among students with different circadian typology. The finding is congruent with the results of some other studies (Digdon, 2010; Voinescu et al., 2010a; Voinescu & Szentagotai-Tatar 2015), but not with the results of the others (Adan et al., 2006; Díaz-Morales et al., 2012). These contradictory results cannot be easily explained since they are in some cases obtained on a very similar population with respect to study programs and age range, with the difference

being instrument used to determine circadian typology and beliefs about sleep (e.g. the study of Adan and colleagues with respect to Digdon and to our study). In other cases, even when the examined participants belonged to different populations, the obtained results were similar (e.g. Adan et al. (2006) with respect to Díaz-Morales et al. (2012), and Voinescu et al. (2010a) with respect to our study). Furthermore, the association between morningness-eveningness and self-estimated level of knowledge about healthy sleep recommendations in helping profession students was also not found in our study. These results suggest that being a “lark” or “owl” may not be relevant neither for accuracy of sleep beliefs or for self-estimation of knowledge about healthy sleep recommendations. It seems necessary to conduct more studies to reach more accurate conclusion about circadian typology as a significant characteristic of a person in determining the level of correctness of one’s sleep beliefs.

Significant association between tendency towards greater morningness and higher self-reported sleep quality is supported with previous studies (Bavarsad et al., 2015; Chung et al., 2013; Digdon, 2010). It would be of interest to examine the relationship between circadian typology and actual adherence to sleep hygiene recommendations in a sample of helping professions students, because in other samples such connections have been found, indicating also its mediation effect between sleep quality and morningness (Barber et al., 2013; Cain et al., 2011; Chung et al., 2013; Vollmer et al., 2014).

In our study the association between correctness of sleep beliefs and self-reported sleep quality was not found, which supports the results of a previous study by Brown and colleagues (2002), where the correctness of sleep beliefs was not associated with sleep quality of psychology students. That finding was incongruent with the results of several other studies (Gallasch, & Gradisar, 2007; Voinescu et al., 2010a; Voinescu, & Szentagotai-Tatar, 2015). As for now, there is still a lack of findings that could clarify the relationship between sleep quality and accuracy of sleep beliefs. To get a more informative insight in sleep beliefs of helping professions students, it is also necessary to investigate the relationship between the correctness of sleep beliefs and the actual adherence to sleep hygiene recommendations. In a study by Gallasch and Gradisar (2007), adherence to sleep hygiene recommendations was a mediator between sleep beliefs and sleep quality, and other studies showed that there was an association of sleep quality and adherence to sleep hygiene recommendations (Brick et al., 2010; Brown et al., 2002; Mastin et al., 2006; Suen et al., 2010). Future studies should aim to determine the relationship between the correctness of sleep beliefs and adherence to sleep hygiene recommendations. It is necessary to emphasize that correct sleep beliefs without knowledge of sleep hygiene recommendations is not enough, because, after all, the final goal of exploring sleep beliefs is their improvement, which could eventually promote the individual's sleep quality.

There were several limitations of the study the authors wish to address. The study could not avoid the general downsides of online studies. Even though the link to this study was posted on specific internet groups, it could not have been controlled who actually participated. Furthermore, the incorrect answers on SBS could have been due to misunderstanding of questions, which could not have been solved in an online study. One of the major problems was the possibility of finding the correct answers on SBS scale via internet, although it was emphasized that the study measured the opinions and not knowledge. However, the correctness of responses in our sample was not as high as expected, so this might probably not have been the case. It would be of paramount importance that the students of helping professions acquire more information about sleep hygiene, because they will inevitably come in contact with clients with sleep problems during their career; therefore they must have good knowledge about these issues. In this line, the between group comparisons of sleep beliefs of students of helping and non-helping professions would improve the validity of our conclusions. Nevertheless, the results of our study provide some basis to plan sleep hygiene education programmes for helping professions students in the first place, but also for other students and other populations.

## References

- Adan, A., Fabbri, M., Natale, V., & Prat, G. (2006). Sleep Beliefs Scale (SBS) and circadian typology. *Journal of Sleep Research, 15*(2), 125-132.

- Agagianian, N. C. (2014). *The Role of Gender, Mindfulness, Rumination and Sleep Attitudes on Sleep Quality in College Students Before and After a Sleep Education Intervention*. Thesis (B. A.). Haverford: Haverford College.
- American Academy of Sleep Medicine (2005). *Sleep Hygiene: Behaviors that Help Promote Sound Sleep*. Westchester, IL: American Academy of Sleep Medicine.
- Asano, K., Ishimura, I., Abe, H., Nakazato, M., Nakagawa, A., & Shimizu, E. (2015). Cognitive Behavioral Therapy as the Basis for Preventive Intervention in a Sleep Health Program: A Quasi-Experimental Study of E-Mail Newsletters to College Students. *Open Journal of Medical Psychology*, 4(01), 9.
- Azevedo, C. V., Sousa, I., Paul, K., MacLeish, M. Y., Mondejar, M. T., Sarabia, J. A., Rol, M. Á., & Madrid, J. A. (2008). Teaching Chronobiology and Sleep Habits in School and University. *Mind, Brain, and Education*, 2(1), 34-47.
- Bakotić, M., Radošević-Vidaček, B., & Košćec, A. (2009). Educating Adolescents About Healthy Sleep: Experimental Study of Effectiveness of Educational Leaflet. *Croatian Medical Journal*, 50(2), 174-181.
- Bakotić, M., Radošević-Vidaček, B., & Košćec Bjelajac, A. (in press). Morningness-eveningness and daytime functioning in university students: the mediating role of sleep characteristics. *Journal of Sleep Research*.
- Barber, L., Grawitch, M. J., & Munz, D. C. (2013). Are Better Sleepers More Engaged Workers? A Self-regulatory Approach to Sleep Hygiene and Work Engagement. *Stress and Health*, 29(4), 307-316.
- Bavarsad, M. B., Azimi, N., Moradbeigi, K., & Latifi, M. (2015). Associations Between Morningness-Eveningness and Sleep Quality Among Female Dormitory Residents. *Thrita*, 4(1).
- Beşoluk, S., Önder, I., & Deveci, I. (2011). Morning-Eveningness Performances and Academic Achievement. *Chronobiology International*, 28, 118-125.
- Brick, C. A., Seely, D. L., & Palermo, T. M. (2010). Association Between Sleep Hygiene and Sleep Quality in Medical Students. *Behavioral Sleep Medicine*, 8(2), 113-121.
- Brown, F. C., Buboltz, W. C., & Soper, B. (2006). Development and Evaluation of the Sleep Treatment and Education Program for Students (STEPS). *Journal of American College Health*, 54(4), 231-237.
- Brown, F. C., Buboltz, W. C., & Soper, B. (2002). Relationship of sleep hygiene awareness, sleep hygiene practices, and sleep quality in university students. *Behavioral Medicine*, 28(1), 33-38.
- Buboltz, W. C., Brown, F., & Soper, B. (2001). Sleep habits and patterns of college students: a preliminary study. *Journal of American College Health*, 50(3), 131-135.
- Buboltz, W. C., Soper, B., Brown, F., & Jenkins, S. (2002). Treatment approaches for sleep difficulties in college students. *Counselling Psychology Quarterly*, 15(3), 229-237.
- Caci, H., Adan, A., Bohle, P., Natale, V., Pornpitakpan, C., & Tilley, A. (2005). Transcultural Properties of the Composite Scale of Morningness: The Relevance of the "Morning Affect" Factor. *Chronobiology International*, 22(3), 523-540.
- Cain, N., Gradisar, M., & Moseley, L. (2011). A motivational school-based intervention for adolescent sleep problems. *Sleep Medicine*, 12(3), 246-251.
- Carskadon, M. A., Acebo, C., & Jenni, O. G. (2004). Regulation of Adolescent Sleep: Implications for Behavior. *Annals of the New York Academy of Sciences*, 1021(1), 276-291.
- Chung, M. H., Liu, W. I., Lee, H. L., & Hsu, N. (2013). Selected Neurophysiological, Psychological, and Behavioral Influences on Subjective Sleep Quality in Nurses: A Structure Equation Model. *PloS One*, 8(11), e79529.
- Cortesi, F., Giannotti, F., Sebastiani, T., Bruni, O., & Ottaviano, S. (2004). Knowledge of Sleep in Italian High School Students: Pilot-test of a School-based Sleep Educational Program. *Journal of Adolescent Health*, 34(4), 344-351.
- Digdon, N. L. (2010). Circadian preference and college students' beliefs about sleep education. *Chronobiology International*, 27(2), 297-317.
- Díaz-Morales, J. F., Prieto, P. D., Barreno, C. E., Mateo, J. C., & Randler, C. (2012). Sleep beliefs and chronotype among adolescents: the effect of a sleep education program. *Biological Rhythm Research*, 43, 397-412.
- Dregan, A., & Armstrong, D. (2010). Adolescence Sleep Disturbances as Predictors of Adulthood Sleep Disturbances—A Cohort Study. *Journal of Adolescent Health*, 46(5), 482-487.

- Fernández-Mendoza, J., Ilioudi, C., Montes, M. I., Olavarrieta-Bernardino, S., Aguirre-Berrocal, A., La Cruz-Troca, D., & Vela-Bueno, A. (2010). Circadian preference, nighttime sleep and daytime functioning in young adulthood. *Sleep and Biological Rhythms*, 8(1), 52-62.
- Gallasch, J., & Gradisar, M. (2007). The relationships between sleep knowledge, sleep practice, and sleep quality. *Sleep and Biological Rhythms*, 5, 63-73.
- Gaultney, J. F. (2010). The prevalence of sleep disorders in college students: impact on academic performance. *Journal of American College Health*, 59(2), 91-97.
- Gomes, A. A., Tavares, J., & Azevedo, M. H. (2002). Sleep-wake patterns and academic performance in university students. Retrieved from <http://www.leeds.ac.uk/educol/documents/00002200.htm>
- Hess, B., Sherman, M. F., & Goodman, M. (2000). Eveningness predicts academic procrastination: The mediating role of neuroticism. *Journal of Social Behavior & Personality*, 15, 161-74.
- Hicks, R. A., Fernandez, C., & Pellegrini, R. J. (2001). Striking Changes in the Sleep Satisfaction of University Students Over the Last Two Decades. *Perceptual and Motor Skills*, 93(3), 660-660.
- Hicks, R. A., Lucero-Gorman, K., Bautista, J., & Hicks, G. J. (1999). Ethnicity, Sleep Hygiene Knowledge, and Sleep Hygiene Practices. *Perceptual and Motor Skills*, 88(3c), 1095-1096.
- Jankowski, K. S. (2012). Morningness/eveningness and satisfaction with life in a Polish sample. *Chronobiology International*, 29(6), 780-785.
- Kloss, J. D., Nash, C. O., Walsh, C. M., Culnan, E., Horsey, S., & Sexton-Radek, K. (2014). A "Sleep 101" Program for College Students Improves Sleep Hygiene Knowledge and Reduces Maladaptive Beliefs about Sleep. *Behavioral Medicine*, 1-9.
- Lacks, P., & Rotert, M. (1986). Knowledge and practice of sleep hygiene techniques in insomniacs and good sleepers. *Behaviour Research and Therapy*, 24(3), 365-368.
- Lima, A. M. A., Varela, G. C. G., Silveira, H. A. C. S., Parente, R. D. G., & Araujo, J. F. (2010). Evening chronotypes experience poor sleep quality when taking classes with early starting times. *Sleep Science*, 3(1), 45-8.
- Lund, H. G., Reider, B. D., Whiting, A. B., & Prichard, J. R. (2010). Sleep Patterns and Predictors of Disturbed Sleep in a Large Population of College Students. *Journal of Adolescent Health*, 46(2), 124-132.
- Mastin, D. F., Bryson, J., & Corwyn, R. (2006). Assessment of sleep hygiene using the Sleep Hygiene Index. *Journal of Behavioral Medicine*, 29(3), 223-227.
- Medeiros, A. L. D., Mendes, D. B., Lima, P. F., & Araujo, J. F. (2001). The relationships between sleep-wake cycle and academic performance in medical students. *Biological Rhythm Research*, 32(2), 263-270.
- Olsen, G. (2014). *The Effects of a Sleep Intervention Program on College Students' Sleep Quality* (Bachelor's thesis, Haverford College, Haverford, Pennsylvania, USA). Retrieved from <http://hdl.handle.net/10066/14658>
- Orzech, K. M., Salafsky, D. B., & Hamilton, L. A. (2011). The State of Sleep Among College Students at a Large Public University. *Journal of American College Health*, 59(7), 612-619.
- Pilcher, J. J., Ginter, D. R., & Sadowsky, B. (1997). Sleep quality versus sleep quantity: Relationships between sleep and measures of health, well-being and sleepiness in college students. *Journal of Psychosomatic Research*, 42(6), 583-596.
- Pilcher, J. J., & Walters, A. S. (1997). How Sleep Deprivation Affects Psychological Variables Related to College Students' Cognitive Performance. *Journal of American College Health*, 46(3), 121-126.
- Quan, S. F., Anderson, J. L., & Hmodge, G. K. (2013). Use of a Supplementary Internet Based Education Program Improves Sleep Literacy in College Psychology Students. *Journal of Clinical Sleep medicine: JCSM: Official Publication of the American Academy of Sleep Medicine*, 9(2), 155.
- Selvi, Y., Aydin, A., Gulec, M., Boysan, M., Besiroglu, L., Ozdemir, P. G., & Kilic, S. (2012). Comparison of dream anxiety and subjective sleep quality between chronotypes. *Sleep and Biological Rhythms*, 10(1), 14-22.
- Smith, C. S., Reilly, C., & Midkiff, K. (1989). Evaluation of Three Circadian Rhythm Questionnaires With Suggestions for an Improved Measure of Morningness. *Journal of Applied Psychology*, 74(5), 728.
- Sousa, I. C., Souza, J. C., Louzada, F. M., & Azevedo, C. V. M. (2013). Changes in sleep habits and knowledge after an educational sleep program in 12th grade students. *Sleep and Biological Rhythms*, 11(3), 144-153.
- Stephoe, A., Peacey, V., & Wardle, J. (2006). Sleep Duration and Health in Young Adults. *Archives of Internal Medicine*, 166(16), 1689-1692.

- Suen, L. K., Ellis Hon, K. L., & Tam, W. W. (2008). Association between Sleep Behavior and Sleep-Related Factors among University Students in Hong Kong. *Chronobiology International*, 25(5), 760-775.
- Suen, L. K., Tam, W. W., & Hon, K. L. (2010). Association of sleep hygiene-related factors and sleep quality among university students in Hong Kong. *Hong Kong Medical Journal*, 16(3), 180-5.
- Taylor, D. J., Clay, K. C., Bramoweth, A. D., Sethi, K., & Roane, B. M. (2011a). Circadian Phase Preference in College Students: Relationships with Psychological Functioning and Academics. *Chronobiology International*, 28(6), 541-547.
- Taylor, D. J., Gardner, C. E., Bramoweth, A. D., Williams, J. M., Roane, B. M., Grieser, E. A., & Tatum, J. I. (2011b). Insomnia and Mental Health in College Students. *Behavioral Sleep Medicine*, 9(2), 107-116.
- Taylor, D. J., & McFatter, R. M. (2003). Cognitive performance after sleep deprivation: does personality make a difference?. *Personality and Individual Differences*, 34(7), 1179-1193.
- Trockel, M., Manber, R., Chang, V., Thurston, A., & Taylor, C. B. (2011). An E-mail Delivered CBT for Sleep-Health Program for College students: Effects on Sleep Quality and Depression Symptoms. *Journal of Clinical Sleep medicine: JCSM: Official Publication of the American Academy of Sleep Medicine*, 7(3), 276.
- Tsai, L. L., & Li, S. P. (2004). Sleep patterns in college students: Gender and grade differences. *Journal of Psychosomatic Research*, 56(2), 231-237.
- Voelker, R. (2004). Stress, Sleep Loss, and Substance Abuse Create Potent Recipe for College Depression. *JAMA*, 291(18), 2177-2179.
- Voinescu, B. I., Coogan, A. N., & Orăsan, R. (2010a). Sleep Beliefs, Subjective Sleep Quality and Diurnal Preference – Findings from Depressed Patients. *Journal of Cognitive and Behavioral Psychotherapies*, 10(1), 1-12.
- Voinescu, B. I., Coogan, A. N., Thome, J., & Orăsan, R. (2010b). Psychometric Properties of the Romanian Version of the Composite Scale of Morningness in Healthy Adults. *Cognitie, Creier, Comportament*, 14(1), 37.
- Voinescu, B. I., & Szentagotai-Tatar (2015). Sleep hygiene awareness: its relation to sleep quality and diurnal preference. *Journal of Molecular Psychiatry*, 3(1).
- Vollmer, C., Hammer, J., Keller, C., Maxand, A. K., Díaz-Morales, J. F., & Randler, C. (2014). Development and evaluation of a sleep education program in middle school pupils based on self-determination theory. *International Journal of Biology*, 3(1).
- Yang, R. H., Hu, S. J., Wang, Y., Zhang, W. B., Luo, W. J., & Chen, J. Y. (2008). Paradoxical sleep deprivation impairs spatial learning and affects membrane excitability and mitochondrial protein in the hippocampus. *Brain Research*, 1230, 224-232.
- Yang, C. M., Lin, S. C., Hsu, S. C., & Cheng, C. P. (2010). Maladaptive Sleep Hygiene Practices in Good Sleepers and Patients with Insomnia. *Journal of Health Psychology*, 15(1), 147-155.