

## Knowledge and Attitude Regarding Sleep Medicine of Medical Students and Physicians in Split, Croatia

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**Aim.** To assess the knowledge and attitudes regarding sleep medicine among second-year medical students and physicians.

**Methods.** A total of 112 respondents were surveyed for their attitude and knowledge regarding sleep medicine and hypertension. The respondents were divided into three groups: 1) second-year medical students (46 or 41%); 2) physicians at postgraduate study program (26 or 23%); and 3) specialists in different fields (40 or 36%). The questionnaire was composed of the sleep medicine attitude test, sleep medicine knowledge test, and hypertension knowledge test. Differences among the groups were statistically analyzed with ANOVA, and differences within each group were analyzed with Wilcoxon test.

**Results.** Postgraduate students and specialists showed better knowledge in hypertension than in sleep medicine ( $p=0.001$  and  $p<0.001$ , respectively). In the student group, no difference was found between the knowledge in hypertension and sleep medicine ( $p=0.192$ ). Differences in sleep medicine knowledge were not found between medical students and specialists ( $p=0.228$ ) or between postgraduates and specialists ( $p=0.647$ ). Sleep medicine attitude score was similar in all groups ( $p=0.470$ ). In general, there was a positive correlation between sleep medicine knowledge and attitude ( $p=0.002$ ), and between hypertension knowledge and sleep medicine attitude ( $p=0.019$ ).

**Conclusion.** Medical students, postgraduate physicians, and specialists showed poor knowledge but positive attitude toward sleep medicine. This finding points to the need for better education in the field of sleep medicine in medical schools.

**Key words:** attitude of health personnel; Croatia; hypertension; knowledge; sleep; sleep disorder

Sleep disorders, although highly prevalent, are rarely diagnosed. There is increasing evidence from both epidemiological and survey studies that disturbed sleep is a common complaint, affecting up to 70 million Americans to varying degrees (1). Sleep disorders are associated with many diseases and can be found in people of all ages (2,3). For example, sleep-disordered breathing encompasses various clinical disorders, including congenital central hypoventilation syndrome (CCHS), apnea of infancy, sudden infant death syndrome (SIDS), obstructive sleep apnea syndrome (OSAS), sleep-related worsening of chronic pulmonary disease, obesity-related breathing abnormalities during sleep, and many others (4,5). Also, disorders of excessive daytime sleepiness constitute a major health hazard, since impaired alertness may lead to accidents and poor quality of life, and some of them are associated with increased cardiovascular morbidity and mortality (6). Sleep disorders are also related to different mental disorders (7). Sleep problems are common in pregnant women and chil-

dren and often harmful to the development and well being of a child (2,3).

Another fact that confirms the importance of research and education in sleep medicine is the direct economic cost of one of the most common sleep disorders – insomnia. In the United States, the total cost of medications used in 1995 for the treatment of insomnia was US\$1.97 billion – nonprescription medications accounting for more than a half of that amount, whereas the total direct costs were estimated at US\$13.9 billion (8).

Despite the high prevalence of sleep disorders, evidence suggests that only a small number of cases are identified or diagnosed by an appropriate health care provider (1). For example, a study conducted in the United States showed only 17 positive diagnoses for sleep disorders in a search of more than a million patient records (1). A possible cause of such ignorance may be the poor attitude toward sleep medicine or widening gap between scientific research and teaching of sleep disorders (9). A study showed that

most American pulmonologists actively involved in the practice of sleep medicine had only informal training in the field, and their performance when dealing with non-pulmonary sleep disorders was unsatisfactory (10).

In Croatia and other transitional countries, there have been no studies dealing with economical, epidemiological, clinical, and educational issues in the field of sleep medicine. Croatian medical schools curricula do not offer courses on sleep medicine, except for an elective undergraduate course at the Zagreb University School of Medicine (11). At the Split University School of Medicine, the physiology of sleep (as an hour-seminar) is taught within the Basic Neuroscience course (12).

This study was undertaken to determine the knowledge and attitude regarding sleep medicine among three groups of subjects with different levels of medical education. Considering that medical school curricula offer no education in sleep medicine, one would expect generally a poor knowledge. We also wanted to examine whether poor knowledge also meant a negative attitude toward sleep medicine.

## Methods

The survey of attitude and knowledge regarding sleep medicine and hypertension knowledge was carried out at the Split University School of Medicine and included a total of 112 persons (56 women and 56 men, Table 1). There were three groups of respondents: 1) 46 second-year medical students (age 19-20); 2) 26 physicians-postgraduate students (age 26-35); and 3) 40 specialists (age 41-60) in different fields of medicine.

**Table 1.** Description of the study respondents (N, %)

Respondents	Total	Men	Women
Students <sup>a</sup>	46 (41)	17 (37)	29 (63)
Postgraduates <sup>b</sup>	26 (23)	10 (38)	16 (62)
Specialists <sup>c</sup>	40 (36)	29 (73)	11 (27)
Total	112 (100)	56 (50)	56 (50)

<sup>a</sup>Second-year medical students, age <21.

<sup>b</sup>Postgraduate physicians (second year), age 26-35.

<sup>c</sup>Physicians-specialists in different fields, age 41-60.

**Table 2.** Sleep Medicine Attitude Questionnaire<sup>a</sup> used in the study<sup>b</sup>

1. Compared to other medical problems, sleep disturbances are usually less important for a patient's health.
2. Sleep disorders interest me.
3. Sleep disorders should be included in the medical school curriculum, even if this reduces time for other topics.
4. I would enroll in a sleep medicine elective if it were available.
5. Inadequate sleep is a lifestyle issue, not a medical problem.
6. Most behavior changes to improve sleep quality are common sense and it is not a good use of my time to learn about them.
7. Sleep disorders are individual problems that are not important for a wide population.
8. Asking about symptoms of sleep disturbances is an essential component of a comprehensive medical evaluation.
9. Patients without sleep complaints need not be asked about their sleep quality.
10. A patient's sleep history is less important than other parts of his/her medical history.
11. Please evaluate on a five-point scale how important is the area of sleep medicine for you personally: 1 – absolutely not important for me, 2 – not important for me, 3 – does not make any difference, 4 – important for me, 5 – very important for me.

<sup>a</sup>Derived from the ASKME survey (13,14).

<sup>b</sup>The possible answers to the first 10 questions were: strongly agree, agree, uncertain, disagree, strongly disagree.

The questionnaire used in the study was composed of three parts. The first part consisted of 11 statements that measured the respondents' attitudes toward sleep medicine (Likert-type, minimum score 11, maximum score 55, Table 2). A five-point scale was used to rank the answers: 1 – strongly disagree, 2 – disagree, 3 – does not have any opinion, 4 – agree, 5 – strongly agree. This part of the survey was derived from the ASKME Survey (14).

The second part consisted of 30 statements to measure the respondents' knowledge in sleep medicine. There were three answers offered for each statement: true, false, and I don't know. Overall knowledge in sleep medicine was determined by adding up the correct answers. This part of the survey was also derived from the ASKME Survey (14).

The third part consisted of 10 questions about hypertension. We used the hypertension test as a standard to compare the knowledge of a well-known field with a relatively unknown and new field of sleep medicine. We composed this part of the questionnaire in collaboration with specialists from the field. The Cronbach  $\alpha$  from the reliability analysis for the Hypertension Test was 0.66.

Data on respondents' sex, age, education level, and current position were also collected.

Second-year medical students and postgraduate physicians were surveyed during regular classes at the Medical School in Split. This approach ensured the full compliance of respondents. Specialists in different medical fields were visited at their work place at the Split University Hospital; those who accepted to participate in the study (compliance rate around 60%) were asked to fill out the questionnaire immediately. The respondents' immediate response ensured that no literature was consulted for the knowledge tests.

## Statistical Analysis

We first computed variables to obtain summary results of each part of the questionnaire. Sleep medicine attitude test results were presented as the summary of answers to 11 questions, according to a five-point scale (minimum score=11, maximum score=55). The other two variables, sleep medicine knowledge and hypertension knowledge, were presented as a proportion of correct answers. ANOVA test was used to estimate the differences between the groups in their sleep medicine attitude, sleep medicine knowledge, and hypertension knowledge. Kolmogorov-Smirnov test was used to test the hypothesis that a sample is taken from a normal distribution. Wilcoxon test was used to estimate differences between the two knowledge tests within each group.

## Results

There were 112 respondents, 56 women and 56 men (Table 1). Kolmogorov-Smirnov test showed that distribution of the sleep medicine knowledge test results did not significantly differ from the normal distribution ( $Z = 0.9$ ,  $p = 0.388$ ), whereas the distribution of hypertension knowledge test results was significantly different ( $Z = 1.89$ ,  $p = 0.002$ ) than the normal distribution.

### Sleep Medicine Knowledge

There was a significant difference in knowledge about sleep medicine among the three groups (ANOVA,  $F = 3.40$ ;  $p = 0.037$ , Table 3), although the post hoc analysis (Scheffe test, Table 3) showed only a borderline difference between students and postgraduates ( $p = 0.05$ ). There was no significant difference between students and medical specialists ( $p = 0.228$ ), or between postgraduates and specialists ( $p = 0.647$ ).

### Hypertension Knowledge

As expected, second-year medical students had lower level of knowledge about hypertension than postgraduate physicians or specialists (ANOVA,  $F = 23.36$ ,  $p < 0.001$ ; Table 3).

A post hoc analysis (Scheffe test, Table 3) showed significant differences in hypertension knowledge between students and postgraduates ( $p < 0.001$ ), and between students and specialists ( $p < 0.001$ ), whereas no difference in the hypertension knowledge was found between postgraduates and specialists ( $p = 0.244$ ).

**Table 3.** Results of sleep medicine and hypertension knowledge tests

Subjects	No. (%)	Knowledge about		$p^c$
		sleep medicine <sup>a</sup>	hypertension <sup>b</sup>	
Students	46 (41)	0.41	0.12 <sup>d</sup>	0.192
Postgraduates	26 (23)	0.50	0.13	0.001
Specialists	40 (36)	0.46	0.18	<0.001
Total	112 (100)	0.45	0.15	<0.001
$p^f$		0.037	<0.001	

<sup>a</sup>Proportion of correct answers to 30 questions (MedSleepSurvey, 14).

<sup>b</sup>Proportion of correct answers to 10 questions.

<sup>c</sup>Wilcoxon test of the differences between knowledge about sleep medicine and knowledge about hypertension within the groups.

<sup>d</sup>Statistically significant vs postgraduates ( $p = 0.05$ , Scheffe post-hoc test).

<sup>e</sup>Statistically significant vs postgraduates and specialists ( $p < 0.01$ , Scheffe post-hoc test).

<sup>f</sup>ANOVA for the differences in knowledge about sleep medicine and hypertension among the groups.

**Table 4.** Sleep medicine attitude test<sup>a</sup> for three groups of respondents

Respondents	No. (%) of respondents	Sleep medicine attitude
Students	46 (41)	38.7 6.9
Postgraduates	26 (23)	39.2 6.0
Specialists	40 (36)	40.4 6.5
Total	112 (100)	39.4 6.5
$p^b$		0.470 <sup>b</sup>

<sup>a</sup>Eleven questions with a 5-point rating scale (Lickert). Maximum score = 55, minimum score = 11.

<sup>b</sup>ANOVA,  $F = 0.76$ .

#### Sleep Knowledge vs Hypertension Knowledge

Postgraduate students showed significantly higher level of knowledge about hypertension than about sleep medicine ( $Z = -3.3$ ;  $p = 0.001$ ). The same was found for specialists ( $Z = -4.1$ ;  $p < 0.001$ ) and all respondents taken as a group ( $Z = -5.3$ ;  $p < 0.001$ ). In the student group, the results of two knowledge tests were similar ( $Z = -1.3$ ;  $p = 0.192$ ).

#### Sleep Medicine Attitude

All groups had a similar sleep medicine attitude score ( $p = 0.470$ , Table 4). The higher the score, the more positive was the attitude toward sleep medicine (Table 2).

There was a significant correlation between sleep medicine attitude and knowledge about sleep medicine in all three groups ( $r = 0.29$ ;  $p = 0.002$ ). Also, positive attitude toward sleep medicine correlated with knowledge about hypertension ( $r = 0.22$ ;  $p = 0.019$ ). However, there was no significant correlation between sleep medicine knowledge and hypertension knowledge ( $r = 0.09$ ;  $p = 0.344$ ).

#### Discussion

The results of our study confirmed that sleep medicine knowledge was generally low in medical students as well as in physicians. Specialists and postgraduates showed greater knowledge about hypertension than about sleep medicine, whereas sec-

ond-year medical students showed equally low levels of knowledge on the two subjects.

Also, specialists did not show better knowledge than students about sleep medicine. Previous studies about sleep medicine knowledge reported results similar to ours (10), and some studies even showed that physicians exhibited worse knowledge than medical students (13). Although they differed in their knowledge, all three groups in our study had similar attitude towards sleep medicine.

One of the difficulties we encountered while conducting a survey was non-compliance from some specialists. Although anonymous, the questionnaire written in a form of test with questions from a relatively unknown field, such as sleep medicine, was not received as well as expected and there was an apparent lack of co-operation. Also, the specialists in different fields of medicine represented a somewhat heterogeneous group, but we categorized them solely with regard to their level of medical education.

The hypertension knowledge test was designed by our group with assistance from specialists in the field and it was derived from the tests used during the regular student courses within the curriculum. In most countries today, medical schools curricula do not include courses on sleep medicine and sleep-associated disorders, or if they do, the number of classes is insufficient for comprehensive education in the field (13,15). For example, in the United States, the average time spent on sleep medicine during the medical school education is 1.6 hours (16), whereas in Great Britain only few minutes are being spent on the subject (15). On the other hand, different specialties get different amount of training in the field. One study showed that pediatricians in the United States receive a mean of 4.8 h of instruction on sleep medicine and sleep disorders (17). The greatest knowledge was about sleep hygiene but the poorest about specific disorders, such as narcolepsy or parasomnia (17).

Sleep medicine topics can readily be incorporated into a cognitive neuroscience module or become an explicit content area in psychiatry and neurology rotations (16). However, a more complete teaching system can be developed if reinforced at all levels of medical education (16).

The results of this study suggest that a very low level of knowledge about sleep medicine is most probably related to the lack of adequate education during undergraduate, postgraduate, and residency programs. However, positive attitude toward sleep medicine in all respondent groups in this study implies that, if better understanding and knowledge of sleep medicine is gained, it may lead to better diagnoses, more appropriate intervention and prevention, and improved quality of life of the patients.

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