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# Wpływ palenia papierosów na aktywność fizyczną i długość oraz jakość snu wśród studentów medycyny. Badania wstępne

**Streszczenie**

**Wstęp.** Palenie niesie za sobą negatywne konsekwencje takie jak uzależnienie czy zaburzenie naturalnej homeostazy organizmu. Aktywność fizyczna i ilość snu także wydają się być istotne w odniesieniu do zdrowia.

**Cel.** Celem pracy była ocena wpływu nałogu jakim jest palenie na aktywność fizyczną, długość i jakość snu wśród studentów medycyny oraz rozważenie czy pochodzenie ma wpływ na tę korelację.

**Materiał i metody.** Anonimowy kwestionariusz został rozprowadzony wśród 134 polskich (grupa P), amerykańskich (grupa A) i norweskich (grupa N) studentów Uniwersytetu Medycznego w Lublinie. Studenci zostali zapytani o ich preferencje dotyczące uprawiania sportu, nałogu palenia, spania i nawyków związanych z procesem nauki. Do oszacowania różnic pomiędzy trzema badanymi grupami użyto następujących testów: Kruskal-Wallis, Mann-Whitney U i Chi-kwadrat test.

**Wyniki.** Większość studentów spośród grup P, A i N nie pali. Wśród grupy P niepalący stanowią 90%, wśród grupy A 88%, a grupy N 80%. Wszystkie trzy grupy studentów medycyny sądzą, iż palenie wpływa negatywnie na ich kondycję fizyczną. W grupie P 10% studentów donosi o problemach związanych ze snem, natomiast w grupach A i N odpowiednio 30,4% i 24% sygnalizuje ten problem. Wszyscy palący uważają, że ich długość snu nie jest wystarczająca w porównaniu do niepalących.

**Wnioski.** Wszystkie trzy etniczne grupy studentów medycyny wykazują ogólnie pozytywną postawę wobec prowadzenia zdrowego trybu życia, jednakże istotne różnice zaobserwowano pomiędzy grupami o odmiennym pochodzeniu. Wyniki wskazują, że palenie wpływa silnie na inne przyzwyczajenia.

**Słowa kluczowe:** studenci medycyny, zdrowie, aktywność fizyczna, spanie, palenie.

# The influence of tobacco smoking on physical activity and length and quality of sleep among medical students. A preliminary study

**Abstract**

**Introduction.** Smoking brings about negative consequences such as addiction and disturbance of the natural homeostasis of organism. Physical activity and the amount of sleep also seem to be vital as far as the health is concerned.

**Aim.** Evaluation of the influence of smoking habit on physical activity, length and quality of sleep among medicine students and confirmation if the origin takes part in this correlation.

**Material and methods.** An anonymous questionnaire was distributed to 134 Polish (P group), American (A group) and Norwegian (N group) students of the Medical University of Lublin. Students were asked about their sport preferences, smoking habits, sleeping and studying habits. To assess differences between the three study groups the Kruskal-Wallis test, Mann-Whitney U-test and Chi-square test were used.

**Results.** The majority of students from the P, A and N groups do not smoke. Among the P group, nonsmokers made up 90%, among A group, 88% and in the N group, 80%. All three groups of medical students claim that smoking negatively influences physical condition. In group P, 10% of students reported sleep-related problems, while in groups A and N, 30.4% and 24%, respectively. All of the smokers think that their sleep duration is not long enough in comparison to the nonsmokers.

**Conclusions.** All three ethnic groups of medical students demonstrated an overall positive attitude towards living a healthy lifestyle, however significant differences were observed between the groups of different origins. The results indicated that smoking strongly influences different habits.

**Keywords:** medical students, health, physical activity, sleeping, smoking.

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## INTRODUCTION

Tobacco smoking is one of the oldest and most widespread human habits. The WHO estimates, that more than one billion people worldwide currently smoke tobacco – approximately one quarter of all adults [1]. Smoking brings about negative consequences like addiction and disturbance of the natural homeostasis of the organism while also influencing human health. Health is fundamental for human well-being, social and economic development. It is determined by modified and unmodified factors such as biological and genetic endowment, gender, culture, social status, environment, education and health service.

In studies of health, medical students comprise an interesting study group. They are subjected to similar stimuli such as high stress levels, environmental pressures and social pressures due to diminished social activity. In addition, medical students have a unique perspective on the risks and consequences of certain behaviors due to the nature of their studies and future occupation.

## AIM

The aim of this survey based study was to evaluate the influence of tobacco smoking on physical activity and length and quality of sleep among medical students. All of these factors are well established as vital determinants of overall health and well-being. In addition to this initial evaluation, a correlation was also measured for place of birth.

## MATERIAL AND METHODS

The participants of the study (N=134) were students of the Medical University of Lublin. The study group consisted of Polish (P group), American (A group) and Norwegian (N group) students with current residency in Poland. The P group consisted of 25 males and 35 females, the A group included 27 males and 23 females and the N group included 8 men and 16 women. The median age of respondents was 22 years (range from 18 to 27) and no statistical differences were observed.

The survey consisted of 47 open-ended and multiple-choice questions. Questionnaires were prepared in two language versions – English, for American and Norwegian students, and Polish. The questionnaire was distributed throughout the Human Anatomy Department at the Medical University of Lublin. Participation in the study was voluntary, and all data collected was anonymous.

The questionnaire used was a comprehensive instrument designed to attain information regarding habits and lifestyle. The questionnaire was created by our research team because it was determined to be the most effective strategy for gaining satisfying results. General questions provided information pertaining to age, gender and origin. Questions regarding the habit of tobacco smoking indicated information about addiction, such as the amount of cigarettes smoked per day, and the influence of smoking on the individual's efficiency. The students were also asked about the regularity and time committed to exercise each week, and if they are satisfied with their physical condition. Sleep habits such as bedtime, difficulty with sleeping, sleep duration and private opinion of its length were addressed in a separate section of the questionnaire. The last sequence of questions was indicative of study themes: time spent learning over 24 hours and existence of sleepless nights caused by learning.

During statistical analysis Kruskal-Wallis, Mann-Whitney U and Chi-square tests were used to asses differences between studied populations. Variables of $p<0.05$ were considered to be significant. Statistical analysis was performed using SPSS software.

## RESULTS

### General information

Information concerning the amount of time designated to daily physical activity, sleep and study duration are shown in table 1.

The median for sleep duration was significantly higher in group P (p=0.006) in comparison to group A. Similarly, the median for study duration was significantly higher in group P (p=0.009) than in group A. A statistically significant difference was observed between group P and N in duration of study, which was significantly higher in group P (p=0.001) in comparison to group N.

**TABLE 1. Median (min-max) of daily physical activity, duration of sleep and study according to the study group.**

| | Group P | Group A | Group N |
|---|---|---|---|
| Physical activity (h/day) | 3.00 (0.50-10.00) | 2.00 (0.00-10.00) | 2.00 (0.00-12.00) |
| Sleep duration (h/day)* | 7.00 (0.00-9.00) | 6.00 (3.00-12.00) | 6.00 (3.00-12.00) |
| Study duration (h/day)* | 7.00 (0.00-16.00) | 5.00 (1.00-12.00) | 5.00 (1.00-12.00) |

* $p<0.05$ between groups by Kruskal-Wallis Test.

### Attitude toward smoking and habit of smoking tobacco

The majority of students from the P, A, and N groups do not smoke. Among the P group, nonsmokers made up 90% of study subjects, 88% in the A group and 80% in the N group. Among smokers, 1.7% of Polish students smoke 40 cigarettes daily and 1.7% of American students smoke 20 cigarettes daily. Among American student smokers, 4.4% smoke 40 cigarettes daily, 4% smoke 35 and 8% smoke 20 cigarettes daily.

### Smoking and its influence on physical activity, sleep and study duration

Polish student smokers exercise significantly longer (p=0.045) in comparison to nonsmokers, whereas Polish nonsmokers sleep significantly longer (p=0.048) than smokers. American non-smoking students have a significantly lower (p=0.003) median of time spent on physical activity in comparison to American student smokers. Among Norwegian students, nonsmokers spend significantly more time on physical activity (p=0.042) and sleeping (p=0.001) but less time on studying (p=0.043) in comparison to smokers. All three groups of medical students claim that smoking negatively influences their physical condition. This opinion is shared by 82.1% of students in P, 78.6% in A and 83.3% in N group.

**Smoking and sleep-related problems**

Problems with sleeping were also examined. In P group, 10% of students reported sleep-related problems, while in groups A and N, 30.4% and 24%, respectively reported problems with sleep. A significant difference (p=0.028) between groups was observed. Sufficient sleeping time was confirmed by 60% of students in the N group (p=0.013), while only 37.3% of students in P and 25% in A groups were satisfied with their sleep duration.

In the P group, it was determined that smoking did not affect students' sleep. However, in group A, students who smoked, did not report sleep-related problems, whereas 35% of nonsmokers significantly reported sleep-related problems (p=0.047). Among smokers in group N, sleep-related problems were more often observed (p=0.001) in comparison to those who did not smoke (80% smokers vs. 10% nonsmokers). Furthermore, the study indicates that all of the smokers believe that their sleep duration is not long enough in comparison to the 25% of nonsmokers with the same opinion. Time spent on daily physical activity, sleep and study duration in non- and smokers in the study groups is shown in table 2.

**TABLE 2. Median (min-max) of time spent on daily physical activity, duration of sleep and time attributed to studying, according to the study group in non- and smoker subjects.**

| | Group P | | Group A | | Group N | |
|---|---|---|---|---|---|---|
| | non-smokers | smokers | non-smokers | smokers | non-smokers | smokers |
| Physical activity (h/day) | 3.00* (0.5-10.0) | 5.25* (1.5-10.0) | 2.00* (0.00-10.0) | 7.00* (3.0-8.0) | 2.00* (0.0-12.0) | 1.50* (0.5-2.0) |
| Sleep duration (h/day) | 7.00* (0.0-9.0) | 5.50* (4.0-8.0) | 6.00 (3.0-12.0) | 6.00 (4.0-7.0) | 6.50* (5.0-12.0) | 5.00* (3.0-5.0) |
| Study duration (h/day) | 7.00 (0.0-16.0) | 8.00 (7.0-10.0) | 5.00 (1.0-12.0) | 7.00 (5.0-9.0) | 4.00* (1.0-12.0) | 6.00* (4.0-10.0) |

* p<0.05 between groups by Mann-Whitney U-test.

**Physical activity and sleep-related problems.**

In P group, the median of time spent on physical activity is significantly higher (p=0.016) in students without sleep-related problems in comparison to those reporting problems with sleep. No statistically significant differences in physical activity were observed between American students with and without sleep-related problems. In the N group, students who reported sleep-related problems, exercised significantly less (p=0.048) and slept for shorter durations (p=0.002) in comparison to students without this problem.

## DISCUSSION

The present study demonstrates the relationship between tobacco smoking and physical activity and the length and quality of sleep among medical students. Moreover, Polish, American and Norwegian groups were taken into consideration. Our results indicate that smoking strongly influences different habits that correlate with nationality.

The attitude towards smoking is an important focus of physicians who are responsible for reduction of smoking rates and patient education and awareness. The study data concerning smoking habits indicates that most students (80-90%) are nonsmokers. These results are optimistic in comparison to the WHO estimates that denote more than one billion people worldwide currently smoking tobacco – about one quarter of adults [1]. Our results correspond with the Steptoe et al. study, depicting that in the Netherlands, student smokers made up 27.2% of the student population, the same for men and women, and in Poland, 26.3% and 25.8% for men and women, respectively [2]. Our data are more optimistic in comparison to Poręba et al., in which 68.2% of Polish students declared to be regular smokers, 31.7% declared occasional smoking, and 57.1% of the study population admitted that they never smoked [3]. Our results are also more promising than the results of Wójtowicz-Chomicz et al., where 29.2% students smoked regularly and 8.4% occasionally and Alexopoulos et al. who found that 35.3% of medical students were smokers, compared with 50.2% smokers among nonmedical students, and Kusma et al., where the prevalence of tobacco use among Berlin's medical students was 22.1% among women and 32.4% among men [4-6]. Furthermore, our data indicates that respondents from our study smoked less in comparison to Pomeranian Medical University students according to Gawlikowska-Sroka et al., where about 20% of Polish and foreign students smoked cigarettes [7].

Medical students of our study showed a negative attitude toward tobacco smoking, which is similar to the results of Siemińska et al., where all the last-year smokers of Polish medical universities were aware of the negative impact of smoking on their health [8]. This was also similar to the Botelho et al. study, where 87.5% of Brazilian medical students identified smoking as a disease [9].

Physical activity not only improves musculoskeletal health and psychological well-being but also reduces risks of heart disease, stroke, obesity and colon or breast cancer. The frequencies of the above mentioned conditions are approximately 40% lower among active persons.

Students in the P and N groups were determined to be physically active. However, according to the analysis of EU countries survey in 2002, only 31% of adult respondents exercise [10]. Our results correspond with the results of Bauman et al. where 73.9% of examined Norwegians were moderate to highly active but differed from the American population where 84.1% were moderate to highly active [11]. Furthermore, results of our study are more optimistic than those reported by Teul et al., in which only 35.4% of Polish dentistry students exercised regularly (three times a week) and Brandão et al., where approximately a one-third of male students and two-thirds of the female students did not participate in any sport [12,13]. Moreover, percentage statistics pertaining to the variety of physical activity among Polish students is similar to the results of Poręba et al., where respondents declared the following distribution of physical activities: swimming (30.1%), jogging (28.6%), cycling (27.0%), and body building (14.3%) [3]. According to the United States Bureau of Labor Statistics civilian populations aged 20-24 spend 0.25 hours per day on weekdays and 0.37 hours per day on weekends and holidays participating in sports, exercise, and recreation [14].

Smoking and physical activity are significant factors affecting human health, condition and well-being. In the P and A groups, smokers exercised longer than their non-smoking counterparts, whereas in the N group, non-smokers

trained longer. According to van Jaarsveld et al. correlations between smoking, dietary habits, physical activity, and sedentary behavior were generally low [15]. This indicates that adolescents' decisions and actions regarding smoking may be triggered differently than other health risk behaviors. Conversely, Audrain-McGovern et al. claimed that physical activity reduced the odds of progressing to smoking or higher levels of smoking nearly 1.5 times [16]. In another survey, Audrain-McGovern et al. showed that sport participation protects adolescents from smoking [17]. She illustrated two reasons for this phenomenon. First, physical activity may increase dopamine levels in the brains of adolescents, make smoking less rewarding, or it may reduce the need of alternative methods to increase dopamine levels, such as smoking. Second, behavioral norms and rules for the athletic subculture show preference for non-smokers. VanKim et al. drew a similar conclusion that smoking tends to have a negative impact on physical activity performance, and this may influence active young American adults to refrain from smoking [18].

The time needed to rest after an active day differs from one individual to the next. According to the World Sleep Foundation most adults under the age of 60 need 8 hours of sleep per night [19]. Comparing data from several studies, there are differences between time spent on sleeping among students. For American students the sleeping time is 7-8 h, for Lithuanian – 7.2±1.4 h, for Palestinian – 6.4±1.1 h, and for Greek students – 7.94 hours [20-23]. In the United States, 25% of people have occasional trouble with sleeping while 10% suffer from insomnia [19]. Our study shows that the sleeping time for each group is comparable – the median for duration of sleep is 7 hours for Polish students, and 6 for American and Norwegian students. This parallels the sleeping time of Polish dentistry students where 53.4% of students declared 4-6, and 18.4% indicated 5-7 hours of sleep per day[12]. These results are also similar to the results of Shin et al. where the mean for total sleep time was found to be 6.3 h per day for male students and 6.5 h for female Korean senior high school students [24]. According to Ghanizadeh et al., among Iranian adolescents the mean duration of night sleep was 7.7 h [20].

A correlation between smoking and sleeping was found in our study. Smokers in both the P and N groups reported sleep disorders, while this finding was not consistent with smokers in the A group. Conway et al. demonstrated the association of sleeplessness, sleep fragmentation, and oxyhemoglobin desaturation during sleep with the amount of cigarettes and years smoked in a clinical population [25]. They found these characteristics of sleep to be more pronounced in current smokers than in former smokers. Moreover, Zhang et al. demonstrated that symptoms of poor nocturnal sleep quality, including nonrestorative sleep, difficulty with morning awakening, and subsequent excessive daytime sleepiness, were more common in current smokers than in individuals that never smoked [26].

To conclude, according to the results of this health survey, medical students from all three ethnic groups demonstrated an overall positive attitude towards living a healthy lifestyle, incorporating daily exercise and a general negative attitude toward smoking. Furthermore, this study reveals that regardless of the students' origin, smoking negatively influences behaviors, health and overall well-being. The limitation of this study was a small number of participants, don't allow the presented results to be generalized for all medical students. This research is the first in this field prepared by our team and we wish to deep our next research by recruiting more participants and make the results more representative.

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