

**Authors' Contribution:**

- A Study Design
- B Data Collection
- C Statistical Analysis
- D Data Interpretation
- E Manuscript Preparation
- F Literature Search
- G Funds Collection

# Health disorders and exercising behaviour that characterize the transitional stage of first-year students at the Lithuanian University of Educational Sciences

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## abstract

- Background** Previous studies have revealed high prevalence of students exhibiting unhealthy behaviour, such as insufficient physical activity during their transitional phase from school to university. Research shows that students' health is worse compared to non-student peers. However, health and its determinants in specific subgroups, such as students -future teachers, have remained largely unexplored. In contemporary society, teachers are expected to fulfil the role of health educators regardless of the subject they teach in school. So they may maintain good health potential and develop healthy lifestyle themselves. The present study aims to estimate the health status of first-year students at the Lithuanian University of Educational Sciences and to determine its relation to exercising behaviour.
- Material/Methods** The study was based on an anonymous questionnaire with the sample size of 314 students.
- Results** The survey revealed that 19.4% of the respondents were taken ill 4 times and more with acute diseases, 35.0% experienced frequent health symptoms over one year prior to the study, 34.7% used some medicine over the past half-year period. Headaches, tiredness in the morning, fast fatigue, nervousness, irritability, and sleeplessness were the most prevalent symptoms among them. In the study group 22.3% of the students were insufficiently physically active as reported exercising once or less per week.
- Conclusions** A relative risk of acute diseases was estimated to be 2.4 times higher for insufficiently physically active students compared to those who exercised at least twice per week.
- Key words** University students, self-reported health status, health symptoms, physical activity

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## INTRODUCTION

Little is known about health and its determinants specific to students' population subgroups, such as students - future teachers. Students from teachers' training programs are future leaders and decision-makers concerning not only the subject they teach in school but also implementation of health education programs. Their responsibility relates to creating health potential, development of health literacy, and setting the standards of healthy lifestyle for their schoolchildren.

For young adults in higher education, the transition from school to university is an important phase. Changing social networks and environments as well as increased freedom from parental control can have a strong effect on health behaviours [1]. While university students have increased control over their lifestyles, they may not necessarily develop behaviour like regular physical activity and achieve best results for their health [2]. The transition into the university environment can potentially offer new 'cues to action' and different social norms that can influence the individual's readiness for behaviour change. It was found that a large number of students start using alcohol [3], do not eat enough fruits and vegetables [4], and do not exercise enough [5].

Insufficient physical activity is a serious health concern among university students, as numerous studies demonstrate high prevalence of sedentary behaviour among them. Survey that analysed nineteen primary studies (published 1985-2001) representing a total of 35,747 students (20,179 women and 15,568 men) from a total of 27 countries (Australia, Canada, China, Germany, Nigeria, the United States, and 21 European countries) [6] revealed that more than half of university students in the United States and Canada are not active enough to gain health benefits. The author concludes that women are among the least active students, and students living off-campus are more active than those living on-campus. Haase et al. have explored leisure-time physical activity in university students from 23 countries [5]. They found that the prevalence of physical inactivity varied with cultural and economic factors, averaging 23% (in North-Western Europe and the United States), 30% (in Central and Eastern Europe), 39% (Mediterranean), 42% (Pacific Asian), and 44% (developing countries). Leisure-time physical activity was related to cultural factors and the stage of national economic development. The relationship between health beliefs and behaviour was pointed out. In a Croatian study authors have also shown a high prevalence of insufficient physical activity among university students and its association with female gender, students enrolled in lower years of study, students originating from smaller communities, smokers, and students with a poorer general health status [7].

Good health is the prerequisite of successful studies at the university; however, the relevant research has consistently shown that students' health is an increasing public health concern in different countries. In a UK student's survey, health was measured by the prevalence of longstanding illness and by the SF-36 health status measurement tool [8]. The results were compared with equivalent data for 18- to 34-year-olds in the local population and also with two national surveys. More than one-third of the respondents reported a long-standing illness, a higher prevalence than in all studies compared. Students scored significantly worse than their peers in the local population on all eight SF-36 dimensions.

The transition to university is associated with notable declines in the quality of life and psychological well-being among students. An Australian study [9] has shown higher levels of stress, anxiety and negative mood among first-year students compared to their non-academic peers. Furthermore, it was found that these scores are typically greater than those of the general adult population [10]. A pilot study of American pharmacy students has revealed higher physical health scores than the population averages [11]. The authors of the study state that if trends of physical inactivity persist, physical health issues may become apparent in the long term. A Hungarian study [12] has investigated the self-reported health status, lifestyle and financial standing of the university students. One third of the respondents reported some health symptoms. The students' overall well-being was associated with eating habits, sleeping and physical activity. The authors emphasised the need to involve health-promoting education programs in the curriculum of all faculties, and to improve the university health service.

In the practical approach, it is important to provide evidence and to offer progressive development for the beneficial impact of health promoting measures at university, such as courses in Physical Education and Health Education. During the last decade physical education and sport activities in Lithuanian universities experienced major changes, as shown in a national survey [13]. This process is related to the adjustments to the EU standards and legal regulations of studies, also other processes taking place at universities. Ten years ago Physical Education was an obligatory subject at all universities. Now, however, despite the fact that universities offer a variety of sport possibilities (mostly not for credit points), students' motivation to participate in organized sport activities has decreased. The survey also elicited that students' health, physical fitness, knowledge and an ability to exercise independently are insufficient. This attitude is supported by an American study [14] suggesting that the field of Health Education and well-trained health educators may positively influence the overall health status of college students.

*Research aim* was to estimate the health status of first-year students at the Lithuanian University of Educational Sciences, an initial teacher training institution, using self-reported measures, and to determine its relation with exercising behaviour.

## **MATERIAL AND METHODS**

The study population consisted of first-year full-time students from the Lithuanian University of Educational Sciences from 20 teachers' training study programs, faculties of Education, Science and Technology, History, Philology, Lithuanian Philology, Social Sciences, Sport and Health Education. The sample size was 314 persons aged 18–23 yrs with the mean age of  $19.35 \pm 1.02$  yrs; 38.2% (120) males and 61.8% (194) females; 67.5% (212) originated from big cities 18.8% (59) from small cities and 13.7% (43) from villages.

The study was based on an anonymous questionnaire. Students' health and exercising behaviour was evaluated using HBSC (Health Behaviour in School-Aged Children) questionnaire [15]. HBSC evaluation was used to ensure comparability of the results for young adults with schoolchildren during their transition from school into higher education. The response rate, i.e.

percentage of students who voluntarily filled out the questionnaire during Health education lectures where questionnaires were distributed, was 95%. Students indicated all acute diseases that appeared during the last year prior to the study. Incidence of acute diseases was estimated calculating all the episodes of diseases that a subject pointed out. All acute diseases (respiratory, gastrointestinal, urinary and general infectious diseases) were included. Two levels were made calculating the number of times the respondent had been ill (0-3 times, and 4 and more times). The first group was considered to have good immune reactivity; the second one was a frequent morbidity group. Students also pointed out chronic diseases that they were diagnosed with and indicated a particular chronic condition (asthma, bronchitis, chronic pneumonia, diabetes, heart diseases, and disorders in endocrine, nervous, blood, muscle-bone, and urogenital systems).

In the questionnaire respondents pointed out the symptoms and ailments, and also their frequency during the last half-year. Considering health ailments (headaches, vertigo, irritability, nervousness, fast fatigue, weakness, sleeplessness, stomach ache, bad appetite, and tiredness in the morning) and their frequency, groups were formed. The group with frequently repeated symptoms comprised the cases when a student reported at least one symptom twice a week or more frequently. The other cases formed the group with lower prevalence of symptoms.

The respondents were also asked to answer questions about the kind of medicines and how often during the last 6 months they used them for headache, stomach-ache, cold symptoms, as well as the intake of antibiotics, medication for nervous tension and sedatives.

Leisure time physical activity (PA) was measured using the item: "How often do you usually exercise so much that you get out of breath and sweat"? Students selected the answer from given alternatives: "every day", "4-6 times a week", "2-3 times a week", "once a week", "once a month" "less than once a month" and "never". In the analysis all responses were divided into two categories: "at least twice a week" and "sometimes or almost never".

Statistical analysis was performed using SPSS statistical packet (version 16). To assess contingency tables,  $\chi^2$ -test was used. A 99% significance level was employed in the analysis. To establish the impact of insufficient physical activity on the health status, the odds ratio (OR) with confidence intervals (CI) was estimated [16]. The OR reflects the relative risk of a health disorder at certain exposure level in comparison with the reference category of exposure.

## RESULTS

In the studied group, 29.0% of the students reported having one or more chronic diseases. Most prevalent was short-sightedness (17.8%), scoliosis (1.8%), heart-diseases (2.2%), and asthma (0.9%). There were several cases of diabetes, diseases of the endocrine system, the digestive system, and arthritis.

Figure 1 presents the prevalence of different health symptoms among university students. Women had a higher prevalence of symptoms compared to men; gender differences were statistically significant almost for all variables and p values ranged from 0.03 to 0.0001. No significant difference was found for bad appetite and sleeplessness.

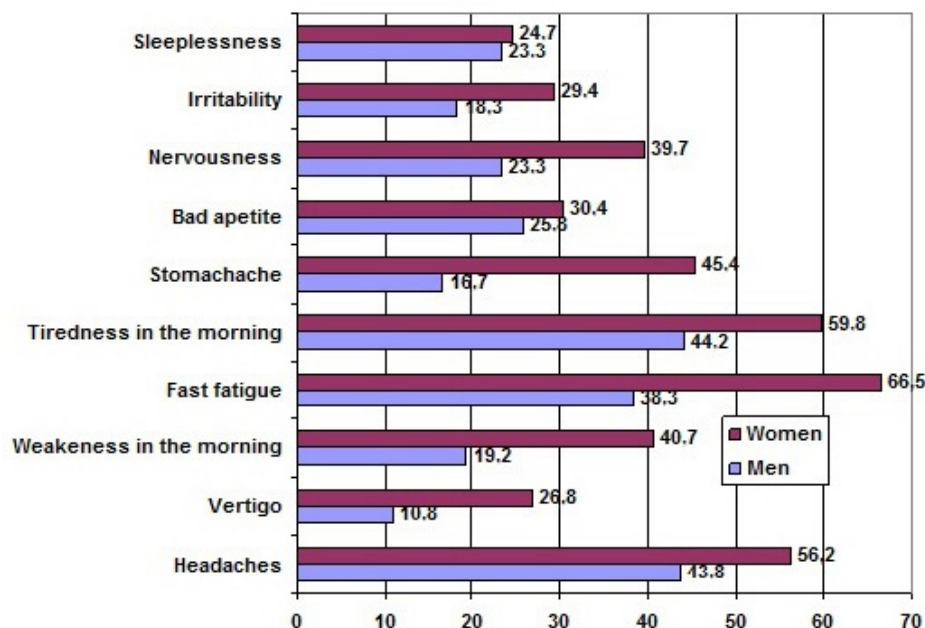


Fig. 1. Prevalence of health symptoms (%) among the students by gender (frequency of the symptom - at least once per week)

The distribution of students' health indicators is presented in Table 1. The study revealed that one fifth of the studied population were taken ill with acute diseases 4 and more times during the year prior to the study; the ratio of women/men was 23.7% vs 12.5%,  $\chi^2 = 5,9$   $p = 0.015$ . No statistically significant difference was found regarding their place of residence or the faculty in which they studied.

It was determined that one third of the study population experienced frequent health symptoms (Table 1); the ratio of women/men was 39.2% vs 28.3%,  $\chi^2 = 3.8$   $p = 0.04$ . Differences between the study programs were found. Given the average of the prevalence of frequent symptoms in the whole group of 35.0%, students from the study programs such as Sport and Health Education showed the lowest prevalence, respectively 21.8% and 22.2%. Students from other study programs and coming from the faculties of Science and Technology, History and Philology demonstrated higher prevalence of frequent health symptoms, respectively 47.1%, 45.0% and 44.1%.

Analysing students' responses regarding the use of medicine, we found that in the whole group during the last 6 month 48.7% of them at least once used medicine for headache (23.6% of them used medicine 3 times and more), 47.1% for cold symptoms, 22.3% antibiotics, 37.3% used medicines for stomach-ache, 8.9% for nervous tension, 8,9% sedatives. Table 1 demonstrates the rate of students' used of medicines at least once during 6 months prior to the study. In the whole group two thirds used some medicine; the ratio of women/men was

75.8% vs 48.3%,  $\chi^2=24,6$   $p = 0.0001$ . There were differences by the faculty: the highest number of those who did not use any medicine during the half-year was found in the faculty of Sports and Health Education (32.3%), and lowest number in the faculties of Education (16.8%), Science and Technology (13.6%), Lithuanian Philology (9.3%), History (6.8%), and Social Sciences (3.7%).

In the whole study population 22.3% were insufficiently active, as they reported exercising once or less per week (Table 2). Other respondents matched a higher PA level, as they reported exercising at least twice a week so as to sweat out and to increase the breathing rate. The highest number of insufficiently active students was found in the faculties of Science and Technology (32.5%), History (30.0%), Philology (28.9%), and Social Sciences (27.8%). The students' place residence showed a significant relationship with PA. Respondents from small cities and villages were more likely to report insufficient PA compared to those coming from big cities; the ratio of inactive students respectively was 30.4% and 9.2%,  $\chi^2=12.6$ ,  $p = 0.001$ .

Incidence of acute diseases was significantly associated with the PA level (Table 3). The relative risk of acute diseases among insufficiently physically active students was 2.4 times higher compared to those who exercised at least twice per week. As can be seen, there is a tendency that the relative risk of frequent psychosomatic symptoms was 1.4 times higher for students who exercise once or less per week; however, the relationship is insignificant.

Table 1. Distribution of the students' health indicators by gender (%)

|  | Men<br>n = 120 | Women<br>n = 194 | Total<br>n = 314 |
|--|----------------|------------------|------------------|
| Incidence of acute diseases                                |                |                  |                  |
| Were ill 4 and more times                                  | 12.5           | 23.7             | 19.4             |
| Weren't ill or were ill up to 3 times                      | 87.5           | 76.3             | 80.6             |
| Frequent health symptoms                                   |                |                  |                  |
| At least one symptom two times per week or more frequently | 28.3           | 39.2             | 35.0             |
| Lower prevalence of symptoms                               | 71.7           | 60.8             | 65.0             |
| Use of medicine at last 6 month                            |                |                  |                  |
| Yes  | 48.3           | 75.8             | 65.3             |
| No   | 51.7           | 24.2             | 34.7             |

Table 2. Distribution of students with different PA level by gender and residence place

| Reported exercising level per week |                     | At least 2 times a week | One time or less per week | Chi-square test             |
|------------------------------------|---------------------|-------------------------|---------------------------|-----------------------------|
| Sex                                | Men                 | 109 (90.8%)             | 11 (9.2%)                 | $\chi^2=19.3$<br>$p=0.0001$ |
|                                    | Women               | 135 (69.6%)             | 59 (30.4%)                |                             |
| Native residence place             | City                | 177 (83.5%)             | 35 (16.5%)                | $\chi^2=12.6$<br>$p=0.001$  |
|                                    | Small town, village | 67 (65.7%)              | 35 (34.3%)                |                             |
| Total                              |                     | 244 (77.7%)             | 70 (22.3%)                | 314 (100%)                  |

Table 3. Relative risk of health disorders by exercising behaviour

| Exercising behaviour        | Incidence of acute diseases           |                           |                  | Frequent health symptoms     |  |                 |
|-----------------------------|---------------------------------------|---------------------------|------------------|------------------------------|--|-----------------|
|                             | Weren't ill or were ill up to 3 times | Were ill 4 and more times | OR (95% CI)      | Lower prevalence of symptoms | At least one symptom two times per week or more frequently | OR (95% CI)     |
| At least two times per week | 205 (84.0%)                           | 48 (68.6%)                | 1                | 163 (66.8%)                  | 41(58.6%)  | 1               |
| One time or less per week   | 39 (16.0%)                            | 22 (31.4%)                | 2.4* (1.31-4.43) | 81 (33.2%)                   | 29 (41.4%)   | 1.4 (0.83-2.46) |

\* Significant difference

## DISCUSSION

Assessing the health potential of first-year students, it was determined that frequent acute morbidity was characteristic of one fifth of them; one third experienced frequent health symptoms, and two thirds used some medicines during the previous half of the year. Headaches, tiredness in the morning, fast fatigue, nervousness, irritability, sleeplessness were the most prevalent symptoms among first-year students. The health status of university students has been examined in the set of previous studies, but the results could hardly be compared with those in the recent study due to different study group's selection criteria, and different study methods; nevertheless, they demonstrate similar tendencies. Shaikh et al. found that stress, depression, fatigue, insomnia, and problems with a diet are common among students living in university residences in France [17]. The Cross-National Student Health Survey in universities in Germany, Bulgaria, and Poland that assessed physical and psychological health [18] emphasized that psychosomatic complaints were the most important indicators in forming a rating frame for student's self-rated health status. No correlation with the country was found. Psychosomatic complaints covered such symptoms as stomach trouble/heartburn, back pain, fatigue, breathing difficulties, trembling hands, rapid heartbeat, sleep disorders/insomnia, difficulties concentrating, depressive mood, lack of appetite, nervousness/anxiety, fear/phobia and others. Higher physical activity in the study was associated with better health.

By comparing the results of the present study with the results from the study with a sample of Lithuanian schoolchildren aged 16-19 years graduating from secondary schools, and assessed by the same method, we found that the percentage of university students and the percentage of schoolchildren who were taken ill with acute diseases 4 times and more during the year prior to the study is similar, respectively 19.4% and 16.1%. The percentages of frequent health symptoms in both studies are different, respectively 35.0% and 73.3% [19]. High prevalence of the symptoms in late adolescence was related to the factor regarding how schoolchildren respond to stressful situations that occurs due to big learning loads during preparation to school leaving examinations. Concerning chronic diseases, the percentage in the students' group is slightly higher (29.0%) compared to the schoolchildren (21.7%). Yet both study results cannot be directly compared, as the findings of the present study are targeted only at a small social group, students - future teachers, and cannot be considered nationally representative. Nevertheless, we can assume that high prevalence of psychosomatic symptoms in adolescence could be the predictor of chronic conditions in their adulthood.

The present study revealed that insufficient physical activity is characteristic of future teachers' lifestyle, as almost every fourth student reported exercising once per week or less so as to sweat out and to increase the breaching rate. Lack of physical activity increasingly becomes part of students' lifestyle all over the world, in particular among women. Other studies have also demonstrated a high percentage of insufficiently active students, which varied depending on study methods. A study of a cohort of German first-year university students showed that 16.0% had zero exercise minutes per week [1]. Men spent more minutes per week exercising than women. Physical activity of 59.5% of the students failed to reach the criterion of exercising vigorously three times a week for a minimum of 20 min. Leslie et al. found that among Australian college students 47% of females and 32% of males were insufficiently active [20]. For females, the significant independent predictors of being insufficiently active were lower social support from family and friends, lower enjoyment of activity, and not working. For males, predictors were lower social support from family and friends, lower enjoyment of activity, and being older. Irish research, which focuses on physical activity among college students aged 18-22, revealed that a significantly higher percentage of males reported participation in organized physical activity/sport (male 57.8%, female 27.5%), whereas females were more likely to participate in unorganized physical activity (female 74%, male 56.8%) [21]. Barriers to physical activity were elements associated with college life (e.g., lack of time, coursework) as well as lack of interest. The present study was not looking at the factors that may influence students' physical activity. Though, we believe that students' lifestyle habits were acquired during their childhood and adolescence. This assumption is premised on the data showing significant differences in physical activity between the students' specialities. There were zero cases with low physical activity among first-year students coming from the study programs such as Physical Education and Ethics and Health Education. Despite the fact that no physical tests were performed entering the university, it is likely that students develop healthier lifestyles compared to those who choose more "academic" specialities (science, technology, history, etc.). Coming from a small city or a village was significantly associated with lower physical activity in our study. The same finding was established in European HBSC (Health Behaviour in School-Aged Children) survey among Lithuanian 11-, 13-, 15-year-old schoolchildren: urban pupils in comparison to rural peers had 1.5 times higher possibility to maintain a proper physical activity level [22].

There is increasing concern that insufficient physical activity causes worse health potential among students. Steven et al. investigated vigorous physical activity, psychological well-being, and self-reported illness during transition to first-year university life in a sample of 175 Canadian undergraduates [23]. Participants completed retrospective measures assessing vigorous physical activity, upper respiratory infections illness (URI), doctor visits, as well as measures of psychological well-being. Based on nationally recommended standards, 61% of students in this study reported engaging in adequate levels of vigorous activity, and there were no differences in URIs between sufficiently and insufficiently active students. This finding is converse to the results of the present study. Our study has not tended to focus on URI only; we included all episodes of acute diseases over one-year period prior to the study, although URI were most prevalent among them. However, in Steven's study insufficiently active students scored lower on psychological



well-being and were twice as likely to have consulted a physician regarding an illness compared with sufficiently active students. Shaikh et al. explains the contexts why the students' overall health suffers [17]. Students living in university residences experience frail living conditions, being away from their homes and families, the stress of studies, a bizarre routine, and absence of readily available guidance. A qualitative study conducted in five university residences in France demonstrated that stress, depression, fatigue, insomnia, and problems with diet were common. Financial problems, too much to study, and relationship break-ups were found to be important impact factors. It was also elicited that students generally sought advice about their health problems among peers and consumed medicines without prescription.

Considering practical implication of the study results, there is an obvious need of interventions in university setting. Physical Education is not in the structure of ECTS courses at the Lithuanian University of Educational Sciences any more. Despite that all students have a possibility of taking optional sport courses or choosing some sportive leisure activities at the university. The prevalence of sedentary behaviour among those whose studies are not related to physical activity is high. As other authors state, the university environment has a unique opportunity to provide options for young people to take up new activities and learn skills that will enable them to be lifelong adherers [20]. Teacher education helps to shape teachers' identities as educators of the whole person as well as their role as subject experts [24]. Exercising behaviour is influenced by environmental, social, personal, cognitive, and physiological factors of physical activity [25, 26]. Other spheres of influence include the environmental context: institutional factors (rules, regulations, policies and informal structures, which may constrain or promote recommended behaviour), community factors (social networks and norms, or standards, which exist formally or informally among individuals, groups and organizations), and public policy (local and state policies, laws that regulate or support healthy actions). Summarizing the considerations of the studies mentioned above, a compulsory Physical Education course in the teacher training study curriculum is probably a more fitting measure of the intervention for this target group.

## CONCLUSIONS

1. High prevalence of health disorders during the transitional stage of first-year students was found: frequent acute morbidity was characteristic of every fifth student; one third of them experienced at least one health symptom twice a week or more frequently.
2. One fifth of the study population were found to be insufficiently active, as they reported exercising once or less per week.
3. Sedentary lifestyles increase a risk of frequent acute morbidity; its relative risk for students who exercise once or less per week is 2.4 times higher compared to those who exercise more often.

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