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**SURVEY OF HEALTH BEHAVIOUR FACTORS AND LIFESTYLE
HABITS OF FOREIGN UNIVERSITY STUDENTS**

Doctoral (Ph.D.) thesis

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Introduction

The World Health Organization (WHO) defines health as "a state of complete physical, mental and social well-being, not merely the absence of disease or disability. Nowadays, the prevalence of non-communicable diseases such as diabetes mellitus (DM), tumours, coronary heart disease and hypertension is increasing, and affecting younger generations as well. Prevention is an important way of controlling non-communicable diseases, using modifiable behaviours to reduce the risk of disease and slow down the deterioration of health. Previous research has shown that certain conditions such as obesity, hypertension, depression or even stress depend on the health behaviour and lifestyle habits of individuals and can be prevented through behaviours such as physical activity, healthy eating habits or limited alcohol and tobacco consumption (WHO, 1946; Huber, 2011).

Assessing the health behaviour of students in higher education is important for several reasons. For students, starting and continuing their studies in higher education, separation from their original background, their family also causes stress. Furthermore, the entry into university life, together with the new norms, values and expectations conveyed by older students, can easily lead to certain health-damaging behaviours. University-age students are at high risk of developing unhealthy lifestyles, which can have a negative impact on their health and well-being (Kovács, 2018).

Despite public health recommendations, physical inactivity rates and sedentary lifestyles are on the rise among young adults, especially those in university. Yet physical activity has been shown to have many benefits, including improved mental health and well-being (Snedden, 2018).

Dietary habits of young adults have been widely researched and the same results have been found in relation to obesity, frequent snacking, skipping meals - especially breakfast - and fast food consumption. Radical changes in eating habits may also be of concern if they are significantly influenced by the geographical location of the individual and cultural differences. Students in higher education are also starting to take responsibility for their eating habits, and students are beginning to develop their own habits by trying new culinary experiences and different novelties. For many individuals, nutrition is a way of coping with stress (El Ansari, 2011; Hilger-Kolb, 2019).

College drinking has become a ritual that students often consider an integral part of the higher education experience. Around one in four college students report that drinking causes them to academic difficulties, such as missing class or falling behind on schoolwork. University

students who drank alcohol in excess three or more times a week were roughly six times more likely to fail an exam or project as a result of drinking than those who drank, but not as much (NIAAA, 2021).

Studies show that smoking among university students is a major public health problem. Among university students, smoking is positively associated with overweight and obesity, insufficient physical activity, and alcohol and drug use (CDC, 2019).

The potential adverse effects on physical and mental health have made the recognition of the concurrent use of more than one illicit drug among university students increasingly important. Some drug use can affect academic performance by reducing intelligence quotient. It can also lead to central nervous system breakdown, addiction and cardiovascular problems (Houvéssou, 2020).

University life affects students' health behaviour in many ways. This may be cumulatively true for students from foreign countries (even from other religions) who are separated from their familiar environment of family and friends. The development of harmful addictions and the prevalence of unhealthy behaviour may increase among university students during their studies.

Objective

- To assess the health behaviour and lifestyle factors of foreign students studying at the University of Pécs, such as physical activity, dietary habits, smoking, alcohol and substance use frequency and other factors in general
- To assess the rate at which foreign university students achieve the WHO recommendation on physical activity levels, how often they experience nutritional problems (stress eating, skipping meals, guilt) and follow the recommendations of the pillars of healthy eating
- Following previous research, examine whether sociodemographic factors influence the frequency and characteristics of certain health behaviours
- To investigate whether health behavioural and lifestyle factors of health students are significantly different from those of non-health students

- To assess whether specific health behavioural factors have an influential correlation with academic performance and the level of stress caused by academic life

Material and method

In our study, we investigated the health behaviour factors and lifestyle habits of foreign students studying at the University of Pécs. Non-Hungarian students aged 18 years and over, who had completed at least one semester, were active students of BSc studies at the time of the survey and were not of Hungarian origin. According to the inclusion criteria, the responses of N= 436 students were analysed.

The questionnaire used in the survey was designed from elements of standard questionnaires used in previous research that was also processed in the literature review:

The questionnaire used in the survey was designed from standard questionnaire items used in previous research that was also processed in the literature review:

- The International Physical Activity Questionnaire- Short form (IPAQ) was used to measure physical activity. The short version of the IPAQ consists of 7 questions, the main topics being vigorous intensity physical activity, moderate intensity physical activity, walking and a quantitative assessment of sedentary lifestyle over the 7 days preceding the study.
- To assess dietary habits, items from the International Health and Nutrition Examination Survey (NHANES- Food Questionnaire) were used to assess adherence to main meals and frequency of consumption of each food group. Possible eating problems were assessed using the Eating Disorder Examination Questionnaire- EDE-Q 6.0, in which the response options to statements were given for the 28 days prior to the survey.
- The students' Body Mass Index (BMI) is calculated as the ratio of their body weight in kilograms to their height in metres squared.
- General health status was measured using various variables such as self-assessment of health status, health awareness, regular medication and number of visits to the general

practitioner. Psychosomatic problems were measured by the frequency of complaints in the past 12 months.

- A self-assessment scale was used to help students indicate their academic performance compared to their peers and how important it was for them to achieve good results.
- The Perceived Academic Stress scale (PAS) measures sources of stress among university students.

Applied statistical methods

Descriptive statistical results are presented with frequency (%), mean \pm standard deviation (SD), minimum and maximum, and mean (CI). For multivariate calculations, a chi-square test was used to test nominal variables, an independent samples t-test and analysis of variance for tests of correlation between scale and nominal variables, and correlation for comparisons of scale-type variables.

Independent variable: sociodemographic variables (sex, age, place of origin, religion, field of education, type of residence), year of education, health behaviour at home

Dependent variables: physical activity, eating habits, smoking, alcohol consumption, substance use, academic achievement, perceived academic stress level, BMI

Results

Based on the inclusion criteria, our sample consisted of N=436 people. N=239 (54.8%) of the sampled students were female. The mean age was 23.89 (SD: 3.51) years. Age was categorized, participants were divided into age groups of 25 years and below and 25 years and above, which resulted in 75.9% of the students being in the first group (under 25 years). In terms of their place of origin, most of the students were from Africa (33.5%) and Asia (31.7%). In terms of their field of study, the students were divided into two groups: those studying in the health field and those studying in the non-health field. Students studying in the health field

made up 82.6% of the sample. In terms of religious affiliation, most of them admitted to following Catholic principles (29.1%), followed by Islam (17.4%).

The majority of students (33%) rated their general health as good. The results of the psychosomatic symptoms survey were as follows: abdominal pain/ heartburn reported by 69.3% of the respondents, back pain by 80.7%, fatigue by 78.3%. Psychosomatic symptoms were more frequent with higher grade point average and age.

According to the World Health Organisation's classification of categories, the majority of students were in the "normal body composition" category. The body mass index of female students in the study was higher than that of male students, and the body mass index of non-health students was lower than that of health students. The eating habits scale (EDE-Q) showed a positive correlation with an individual's BMI classification, the higher the category (i.e., the higher the index, the worse the BMI classification), the worse the respondent reported eating habits.

In our research, we used the IPAQ questionnaire, as described above, to measure the physical activity of the students over the 7 days preceding the survey. Examining vigorous and moderate intensity physical activity, we found that the majority of students (89.9%) had not exercised in the 7 days prior to completing the questionnaire. Prior to completing the questionnaire, most of the participants sat for eight hours per day (26.6%), with 53 reaching 10 hours per day. Our results show that non-health students walked significantly more time per session than health students. Slightly more than 50% of the students performed at least one session of vigorous intensity exercise, while almost half of the students did not perform moderate intensity exercise. Significant differences were found between physical activity and some indicators of dietary habits, smoking and alcohol consumption.

Of the three main meal times, lunch and dinner are the ones that the majority of students stick to the most. They rarely went to fast food restaurants, but most ate sweets several times a week. Students did not meet international and national recommendations, with most eating irregularly vegetables and fruits, whole grains, milk and dairy products, meat, while they tended to over-consume sugars and fats. Students under 25 years of age eat fast food more often than students over 25 years of age ($p=0.005$), and students in the non-health field eat breakfast more often ($p=0.046$). Students who did not consume enough vegetables and whole grains had significantly higher BMIs. Examination of the items on the Eating Problems Examination Questionnaire (EDE-Q) revealed that the majority of students were concerned about limiting

the amount of food they ate each day, problems with shape, weight problems and problems with eating. When compared with psychosomatic symptoms, it was found that the more often the respondent reported depressive symptoms, anxiety or sleep problems in the previous month, the more problems they had with eating-related behaviour.

25.6% of those surveyed currently smoke, with 9.9% using cigarettes. In terms of frequency, 9.2% of smokers smoke between 1 and 10 cigarettes a day. A significant difference was found between smoking and religious affiliation. Although there was no significant difference, it should be highlighted that more than 80% of students in the health field smoke regularly. 62% of students who smoke regularly would like to reduce their smoking frequency, but only 41% had tried to do so in the 1 year prior to the survey.

19.3% of students drink alcoholic beverages on a weekly basis. Around 40% of students who drink alcohol consume 1-2 units (1 unit of alcohol is equivalent to 10 ml or 8 grams of pure alcohol) of alcohol on an occasional basis. Loss of control due to binge drinking, which is common among university students, in the past year was reported by 17.5% of respondents. 36.4% of respondents said that they had had an incident in the past year where they could not remember what had happened. Women were significantly more likely to have experienced memory loss after drinking alcohol. Further significant differences were found by place of origin and type of residence. A closer look at BMI and alcohol consumption revealed a significant association between BMI and uncontrolled drinking. There was a significant difference between the presence of psychosomatic symptoms such as depression and the frequency of alcohol consumption ($p=0.029$).

16.1% of respondents have tried and 1.4% are regular drug users. Based on previous research variables, we asked what drugs the students had used. Almost 50% of respondents had tried marijuana, 22.7% had tried tranquilizers and 22.3% had tried strong painkillers. A significant difference was found between substance use and religious affiliation.

When comparing harmful addictions, no significant difference was found between smoking, alcohol and drug use.

Analysis of the Perceived Academic Stress Scale shows that the higher the average score, the lower the level of academic stress. The mean score on the Likert scale ranging from 1 to 5 on the PAS scale was 55.44 (SD: 7.61). Significant differences were found for gender, academic progress, place of origin and religious affiliation. Higher stress scores induced worse health status.

Discussion

A health-promoting lifestyle is a determinant of health status and is known to play an important role in maintaining and improving health. Modifiable lifestyle factors such as physical activity, smoking, eating habits and alcohol consumption have a significant impact on the development of chronic diseases and their risk. Assessing the health behavioural factors and lifestyle habits of university students is important for a number of reasons. Starting and continuing studies in higher education can be stressful for students. Unhealthy behaviours can add up, which can have a multiplier effect. University students have more health complaints than other age groups, but most of them do not seek help to solve their problems.

The WHO recommendations for vigorous and moderate-intensity physical activity were not achieved by the majority of students. The results of our study are in line with previous research showing that university students do not exercise regularly, despite the fact that most of them say that physical activity is an important factor for their health (Sok et al., 2020; Müller et al., 2022). Only a low percentage of students did not walk at least once during the survey period, a result that differs from previous research where a much higher percentage of students avoided walking (Reuter et al, Contrary to the results of a previous study, in the present study the physical altitude indicators of non-health students were better than those of health students (Almutairi et al., 2018). Our results show that the alcohol consumption habits of the students in this study are related to their responses to the IPAQ questionnaire, unlike the results of Niedermeier et al. (2018).

Eating habits reflect individual dietary preferences and are often linked to culture, education, socio-economic background and health status. Eating habits can also be influenced and altered by life stage, lifestyle factors such as physical activity, and social engagement (Krause et al., 2015). Eating habits can be associated with cognitive function and school performance. Compliance with main meals and international and national recommendations for specific food groups were not followed by the majority of students. The consumption of fruit and vegetables, whole grain bakery products, milk and dairy products was irregular and did not follow recommendations. Contrary to previous research (López-Gil et al., 2022; Alqahtani et al., 2020), our results showed no association between dietary habits and academic performance. The intake of some nutrients is below the recommended amounts, in contrast to the results of Lesinska-Sawicka et al. (2021), the consumption of vegetables and fruits is very rare among

students, most of them prefer to consume only weekly this important source of dietary fibre. Whether or not they are students in a health field showed a significant difference only in the frequency of breakfast consumption, surprisingly, students in non-health fields eat breakfast more often. Almatuiri et al. (2018) also found no significant differences between students in different fields of study, where they did, they found a difference in favour of health students. In terms of drug use habits, students aged 20 to 22 years have higher rates of drug use than their non-student peers, indicating that the combination of age and student status is a risk factor for increased drug use. The prevalence of substance use tends to decrease during university studies (McAlaney et al., 2021). We did not obtain the same results in our study. Although the results of several studies show that the use of harmful addictions entails the use of other harmful substances, in our study we did not find significant differences between smoking, alcohol consumption and substance use, in contrast to the results of the study by Matejovicova et al. (2015).

One third of the respondents smoke regularly, a value consistent with the results obtained in previous studies (Al Omari., 2021; Wamamili et al., 2019). The hypothesis that the prevalence of smoking decreases as the years of study progress has not been confirmed. Based on the results obtained, it can be said that in our study, study outcome, stress level and the onset of psychosomatic symptoms are not associated with smoking.

For many university students, frequent, excessive drinking with other students is an "integral part" of higher education. Accordingly, it is not surprising that socialising with friends and expectations of excessive alcohol consumption are two of the dominant influences motivating students' participation in nightlife (Tarrante et al, 2019). A very high number of students did not remember what happened on one or two occasions, i.e. the majority of students usually stop for e.g. two short drinks, but there are cases of memory loss as a consequence of excessive drinking. significant results were found when controlling for place of origin, type of residence and the person of the roommate. No significant difference was found when comparing with religious affiliation, an interesting result because the religion of the followers of Islam prohibits the consumption of alcoholic beverages.

An analysis of factors affecting academic stress levels revealed that female students are less stressed than male students during their training, and that over the course of their training, students become accustomed to the expectations and the burden of classes and exams, and their stress levels decrease steadily. No correlation was found between the IPAQ, EDE-Q and PAS

scale scores, but stress levels did influence general health, so that students with higher stress levels had worse health.

Conclusion

Our quantitative research focused on the health behaviour and lifestyle factors of foreign university students. Starting and continuing their studies in higher education presents students with new challenges, new norms, values and expectations, which together can easily lead to certain health-damaging behaviours.

Health behaviour and lifestyle factors and their impact on academic performance and stress levels can be assessed using questionnaire techniques.

Standard questionnaires and questions based on the methodology of previous research were used to analyse the health behaviour of foreign university students studying in different courses at the University of Pécs. The university's different training palette gave us the opportunity to analyse students according to their fields of training, based on whether they were studying health or non-health careers. A further aspect of the study was to analyse differences between gender, religion, place of origin, age groups and years of education, and to explore the relationship of certain factors with academic performance and academic stress levels.

Overall, although the majority of the students had a body mass index in the "normal" category, their health behaviours did not meet international recommendations. Young people do not take enough exercise, the WHO guidelines for physical activity levels were adhered to by less than a quarter of the sample, and there was little significant variation when comparing individual variables.

The frequency of eating breakfast, also referred to as the most important meal, was relatively higher (40%), but a negligible percentage of students consumed fruit and vegetables. The frequency of female students eating breakfast, going to fast food and snacking was significantly higher than that of males. Contrary to our expectations, the frequency of breakfast consumption was significantly higher among students studying in non-health fields. Eating problems were associated with the presence of psychosomatic symptoms.

The survey on harmful addictions found that a third of the sample smoke regularly, almost as many drink alcohol on a weekly basis and half have used drugs. The prevalence of these harmful behaviours did not decrease with years of training, nor was there evidence that those with higher academic stress levels were more likely to engage in these activities.

No significant correlation was found between health behavioural factors and perceived stress level, which decreased steadily as the academic years progressed, but higher stress levels indicated poorer general health.

Summary of new findings

- The physical activity level of foreign university students is low, with less than a third of the sample achieving the WHO recommendations for aerobic physical activity.
- The majority of students do not observe the main meals, especially breakfast. The frequency of consumption of vegetables, fruit, meat and wholegrain cereals, which are the mainstays of a healthy diet, does not reach the levels recommended by Hungarian and international recommendations.
- The majority of students struggle almost every day with body image disturbance, try to control their eating, eat secretly.
- Health behaviour factors of students in the holistic field are not better than those of students in the non-health field, and in some factors students in the non-health field have better results.
- Health behavioural factors do not improve with age and years of training, and the use of harmful addictions does not decrease
- No association with lifestyle factors was found for academic stress and academic performance

Recommendations

1. We would propose to extend the research to all universities in Hungary where foreign students are studying.
2. It would be a step forward if the assessment of certain health determinants were not only based on subjective, standard questionnaires, but also on the collection of objective data (measurement tools).
3. It would also be of future value to assess the health factors of Hungarian students and compare them with those of foreign students.
4. It is proposed to investigate additional factors such as sexual life, access to health care, adherence to medical treatment, attendance at screening tests, uptake of vaccinations.
5. To increase the level of physical activity, it is proposed to include physical education as a compulsory subject in the students' curriculum, with several sessions per week, with active participation. On the basis of the "Challenge Day" programme, we propose the organisation of a "competition programme" between university faculties, which would encourage young people to do more sport, thus improving their health and giving them a chance to win their own training places.
6. We propose the creation of a restaurant on university campuses, with a choice of menus, meals, fruit, salads, snacks, etc., agreed with a dietician

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