

A CROSS-SECTIONAL STUDY OF UNIVERSITY SURROUNDINGS AND OBESITY RISK AMONG EUROPEAN STUDENTS: FINDINGS FROM THE EDU-FIT PROJECT

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Recognizing the importance of healthy habits, the EDU-FIT project aims to promote awareness and healthy lifestyles among students, shaping them as future leaders of healthier societies. We performed an analysis of best practices in developing healthy lifestyle habits among students. The study encompassed 1533 students with a demographic skew towards females (72%), a median age of 21 years, and a median BMI of 23 kg/m². Most were in early study years, primarily in Natural and Applied Sciences. Notably, there was high percentage of students who didn't reside in their home region (69%), raising concerns about access to university cafeterias (20% lacked access) and high reliance on takeaway food (80%). Despite 30% lacking access to exercise facilities, over 80% engaged in physical activity at least three times weekly, indicating a potential need for improved facilities. The absence of courses focused on healthy habits in university programs highlights a significant gap in promoting student well-being. This prompts the question: is university solely for education or also for nurturing well-being? EDU-FIT underscores that both knowledge and health are vital for future success.

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1 Introduction

Student life presents a critical transitional period marked by increased academic pressure, psychological stress, and substantial lifestyle changes. Entering university often involves separation from family, greater personal responsibility, and increased independence, all of which significantly influence daily habits and health behaviors (Deliens, 2014; Vadeboncoeur, 2015). This transition is frequently associated with insufficient sleep, irregular and nutritionally poor diets, reduced physical activity, and elevated stress levels, factors that together contribute to body weight changes among students (Serlachius, 2007; Kozak, 2025).

Obesity has become an increasingly prevalent public health concern among young people in the European Union, posing serious health, social, and economic challenges (World Health Organization, 2022; NCD Risk Factor Collaboration, 2024). Weight gain during early adulthood is particularly concerning, as it often persists into later life and increases the risk of non-communicable diseases, including type 2 diabetes, cardiovascular disease, musculoskeletal disorders, and certain cancers (Sierpiński, 2025). In addition to physical health consequences, obesity is strongly associated with adverse mental health outcomes such as depression, anxiety, and reduced self-esteem (Beck, 2025; Sanseverino, 2025).

University environments play a decisive role in shaping students' health-related behaviors. Factors such as access to healthy food options, opportunities for physical activity, availability of health-promoting infrastructure, and exposure to credible health information all influence lifestyle choices during this period (Fonderie, 2024; Wang, 2025). However, evidence suggests that many students rely primarily on digital and social media sources, which may lack scientific accuracy, for health information, while evidence-based guidance from universities and healthcare professionals is underutilized (Percheski, 2011; Schäfer, 2021).

Addressing obesity among young adults therefore requires a comprehensive, multi-sectoral approach that integrates education, health promotion, environmental support, and policy interventions (Dejhalla, 2025). Collaboration between universities, public health institutions, policymakers, and communities is essential to promote sustainable healthy behaviors and prevent long-term health consequences.

In response to these challenges, the EDU-FIT project was initiated as a multinational collaboration involving university partners from Slovenia, Croatia, Portugal, Slovakia, and Norway. The project aims to enhance student health and well-being through accessible and sustainable online resources, supporting informed lifestyle choices related to nutrition, physical activity, and overall well-being (Shimizu, 2025). By targeting the university environment, EDU-FIT seeks to address key determinants of obesity risk during a formative life stage.

2 Methodology

The initial phase of the project involved the creation of a questionnaire. A comprehensive questionnaire comprising 18 questions was crafted to gather vital demographic information, study-related insights, and understand the impact of lifestyle on body weight. To streamline the process and ensure accessibility, Google Forms was employed. The questionnaire was translated into all partner languages, and a convenient link was disseminated through various social media platforms during November and December 2023 to facilitate student participation without the need for direct email contact. This approach aimed to enhance engagement and inclusivity within the study, fostering a seamless exchange of valuable data across diverse linguistic backgrounds.

Each questionnaire commenced with a concise introduction elucidating its purpose, setting the context for participants. Subsequently, a series of thoughtfully designed questions were presented. To ensure transparency and ethical conduct, a disclaimer was included, outlining the confidentiality of responses and the voluntary nature of participation. This approach aimed to establish clarity and trust among respondents, fostering an environment conducive to candid and meaningful responses.

To fulfil the questionnaire, approximately 5 minutes were allocated for completion, respecting participants' time commitments. Given that no email contacts were utilized, GDPR compliance was ensured, safeguarding the privacy and data protection rights of respondents. The Ethics Committee of University Hospital Centre Zagreb and the Faculty of Humanities and Social Sciences University of Zagreb approved.

English version of the questionnaire

Dear Student,

We kindly request you to spare a few moments of your time to participate in a brief survey focusing on healthy lifestyles within university environments. Your responses will remain anonymous, and no personal data will be disclosed.

*Our initiative is part of the Erasmus plus EDU-FIT project (**INCLUSIVE SOCIAL EDUCATION FIT FOR HEALTHY LIFE-STYLE: PREVENTING OBESITY IN YOUNG ADULTS No 2023-1-SI01-KA220-HED-000154000**), a collaborative effort involving partners from six countries: Croatia, Slovenia, Portugal, Slovakia, and Norway. This project is proudly sponsored by the European Union and has a noble mission: to enhance student well-being through accessible and sustainable online resources.*

Your feedback will play a pivotal role in the development of tools and solutions aimed at fostering a healthier university experience for all. Your participation is greatly appreciated, and together, we can make a positive impact on the well-being of students like yourself.

****Demographic Information: ****

1. Gender:

- Male - Female - Other

2. Age (years):

3. Height (in centimeters):

4. Weight (in kilograms):

5. Year of Study:

- 1st Year - 2nd Year - 3rd Year - 4th Year - 5th Year - 6th Year

6. Area of Study:

- Business (accounting, economics, finance, management, marketing)
- Humanities (art, history, languages, literature, music, philosophy, religion, theatre)
- Natural and applied sciences (biology, chemistry, computer science, engineering, geology, mathematics, physics, medicine)
- Social sciences (anthropology, education, geography, law, political science, psychology, sociology)

7. Do you study at your permanent residence?

- Yes - No

****Weight and Lifestyle: ****

8. Have you experienced any weight change during your study?

- Weight loss
- Maintained the same weight
- Gained less than 5 kg
- Gained 5-10 kg
- Gained more than 10 kg

9. What is the primary reason for your weight change?

- Stress
- Unhealthy eating habits
- Lack of physical activity

- Other (please specify):

**Diet and Nutrition: **

10. Do you have access to a university cafeteria (cantina)?

- Yes - No

11. How often per week do you eat in the cantina?

- 1 - 2 - 3 - 4 - 5 or more

12. How often per week do you cook?

- 1 - 2 - 3 - 4 - 5 or more

13. How often per week do you order take-away food?

- 1 - 2 - 3 - 4 - 5 or more

**Physical Activity: **

14. Do you have access to a place for exercising at the university?

- Yes - No

15. How often per week do you exercise?

- 1 - 2 - 3 - 4 - 5 or more

**Awareness and Information: **

16. Are you aware that food choices can affect climate change?

- Yes - No

17. Where do you primarily get information regarding a healthy lifestyle? (Select all that apply)

- Parents

- Friends

- Physician

- University

- Webpages and portals

- Social media

18. Do you have any course in your university program which focuses on developing healthy life-style habits?

- Yes - No

Thank you for participating in this survey! Your input is valuable in helping us understand the impact of university life on various aspects of well-being and lifestyle choices.

PRIVACY POLICY

The EDU-FIT project will manage, store, and use the data submitted through this form, including personal information (gender, age, among others) only for the purpose of evaluating, contacting, and ensuring the execution of the project. Your data can be requested, or any questions you have regarding your data answered, through the following email edu-fit.projekt@um.si. The data will be kept until the EDU-FIT project (Grant agreement ID: 2023-1-SI01-KA220-HED-000154000) no longer needs it to the execution of its activities or for reporting/ legal reasons, which may extend slightly beyond the project's duration.

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3 Analysis of the questionnaires

We conducted an analysis of a total of 1533 responses from students representing partner countries participating as universities, excluding Norway, which was a non-university partner. Furthermore, we gathered responses from Erasmus Plus students studying as exchange students. It's worth noting that most participants were from Croatia and Slovenia. Descriptive statistic was used.

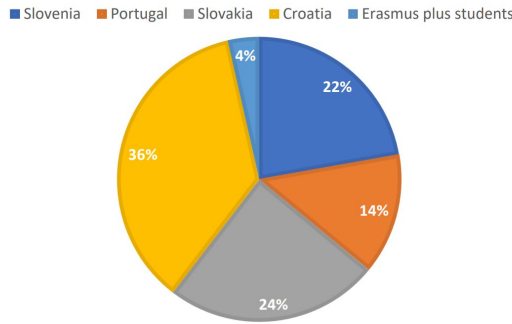


Figure 1: Participants country of residence

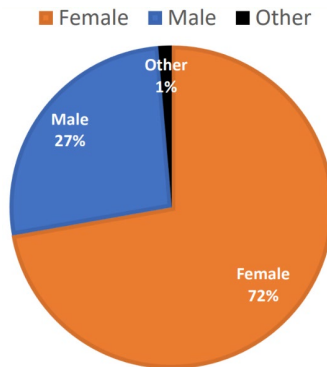


Figure 2 Participants by gender

Demographic and anthropometric survey analysis

The vast majority, 72%, of participants were females, and this trend was consistent across all countries. This could be attributed to the nature of the study they were involved in or perhaps reflects the specific interests of adolescent females in health-related topics.

The median age of the participants was 21 years, with a standard deviation of 4.8. Their median height was 170 cm, with a standard deviation of 9.2, while the median weight was 64 kg, with a standard deviation of 14.6. This yields a body mass index (BMI) of 22.1 kg/m². In average, all students had optimal BMI. Students from Slovenia had the lowest average BMI of 21.6 kg/m² and students from Croatia had the highest at 23.1 kg/m². Over 50% of the participants were in their first or second year of study, indicating that they had recently commenced their academic journey. This finding may introduce a potential bias, as new students are often more eager to engage in activities and research opportunities. Furthermore, their lifestyles are undergoing significant changes at this early stage, which could potentially impact their behaviors and responses differently compared to more established students. As their academic and personal routines evolve, their levels of engagement and susceptibility to various influences may also change over time.

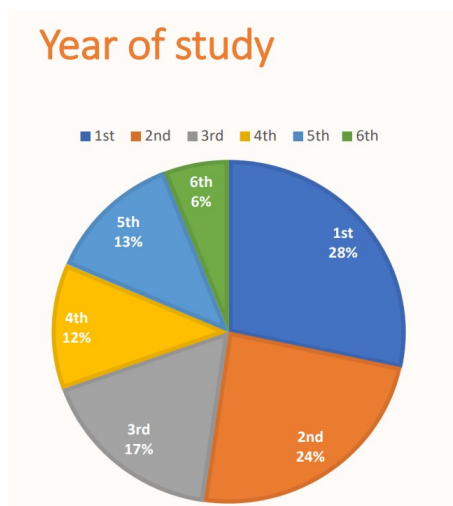


Figure 3: Participants year of study

A significant proportion of the participating students, nearly half, pursued studies in the Natural and Applied Sciences domain, encompassing fields such as biology, chemistry, computer science, engineering, geology, mathematics, physics, and medicine. Approximately 20% of students were engaged in Social Sciences disciplines, including anthropology, education, geography, law, political science, psychology, and sociology. Similarly, another 20% were dedicated to Humanities

studies, spanning art, history, languages, literature, music, philosophy, religion, and theater.

Conversely, a smaller segment, comprising only 13%, focused their academic pursuits on Business-related disciplines, such as accounting, economics, finance, management, and marketing. This diverse distribution reflects the varied academic interests and pursuits among the student population, contributing to a rich and multifaceted learning environment.

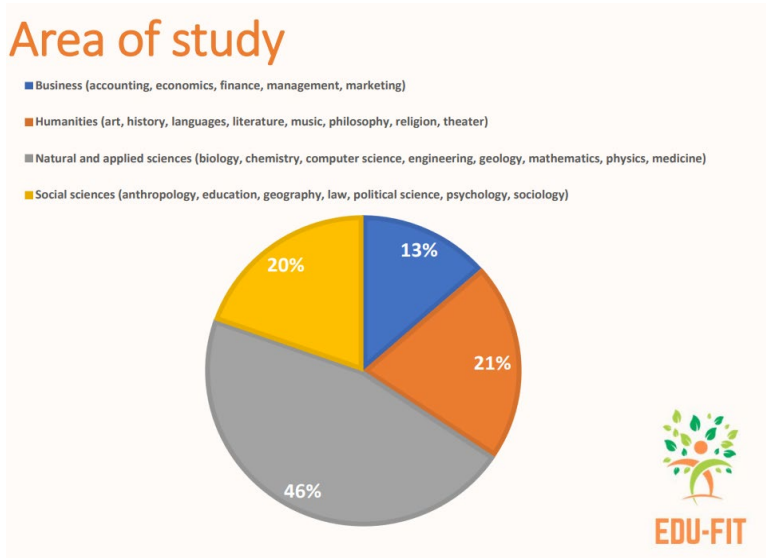


Figure 4: Participant’s area of study

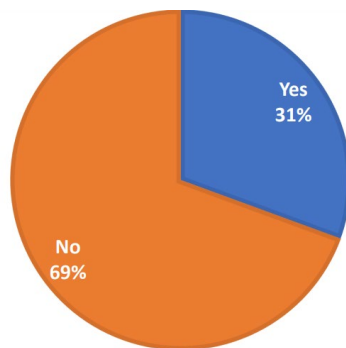


Figure 5: Participants by studying at permanent residence

Students were further queried about whether they study at their permanent residence. Astonishingly, nearly 70% indicated otherwise, suggesting a prevailing scenario where students must independently manage various aspects of their lives, including meals, housing arrangements, and both physical and mental well-being. This statistic underscores the considerable autonomy and responsibility shouldered by students as they navigate the complexities of academic life away from home.

Relationship between body weight and lifestyle

In our subsequent analysis, we directed our attention toward exploring the relationship between body weight and lifestyle. Participants were asked whether they had experienced any changes in weight during their studies. Surprisingly, approximately 65% of students reported either experiencing weight loss or maintaining their weight. However, 24% disclosed gaining less than 5 kg, 13% reported a weight gain between 5 to 10 kg, and 4% admitted to gaining more than 10 kg.

This statistic is cause for concern, particularly considering that a significant proportion of students are in their first two years of study. It raises the troubling prospect that if only those nearing the end of their studies were surveyed, the statistics could potentially be even more alarming.

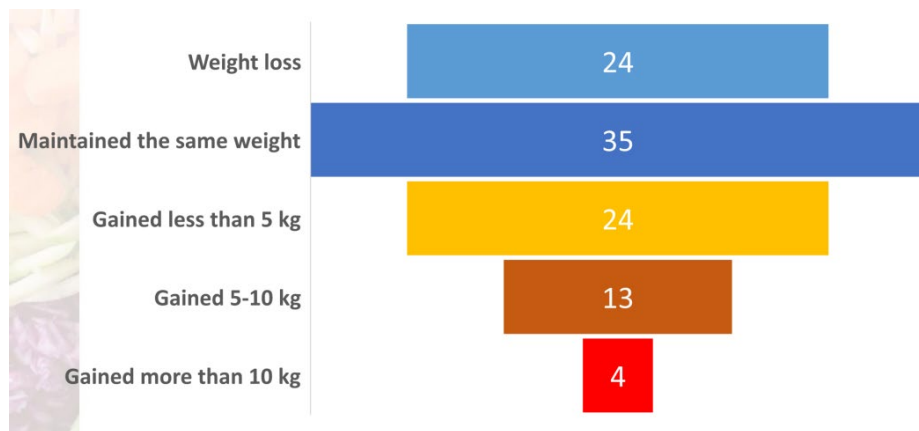


Figure 6: Change in weight during the study

The subsequent question delved into identifying the primary reasons behind students' weight changes. Alarming, 33% of respondents attributed their weight fluctuations to stress, indicating a significant risk factor impacting both mental and physical well-being. Conversely, less than 20% cited unhealthy eating habits and a lack of physical activity as contributing factors.

This data sheds light on the pervasive influence of stress on students' health, underscoring the need for interventions aimed at managing stress levels and fostering resilience.

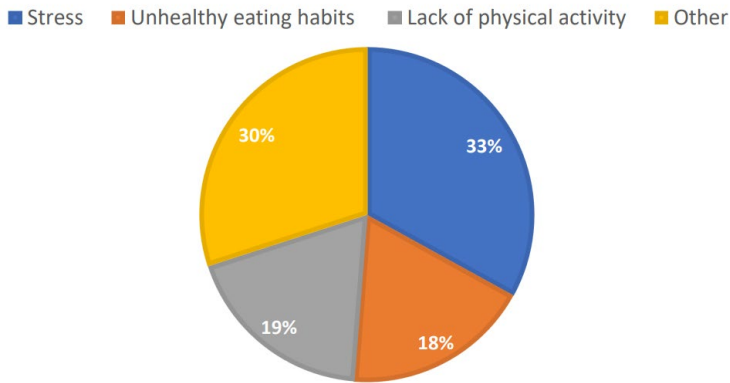


Figure 7: Primary reasons behind weight change

Nutrition

During our survey, students were questioned about their access to a university cafeteria, also known as a cantina. Surprisingly, close to 20% of respondents indicated that they did not have access to such facilities. This raises an important question regarding the well-being of those students who lack access to a cantina, particularly those who do not reside in a permanent location. How do they manage their daily meals? This inquiry highlights a potential gap in support services for students, especially those who may face challenges in sourcing affordable and nutritious meals while balancing academic commitments.

The subsequent question inquired about the frequency of students' visits to the

university cantina per week. Remarkably, nearly 50% of respondents revealed that they eat there only once a week, suggesting a reliance on other sources of food for the majority of their meals. This indicates that for many students, the cantina doesn't serve as a primary source of sustenance throughout the week.

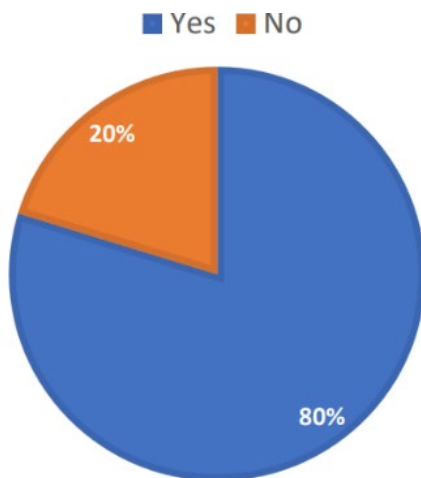


Figure 8: Access to a university cantina

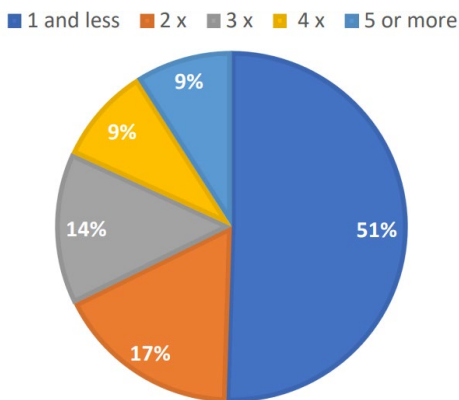


Figure 9: Frequenti of visit to cantina

Continuing our survey, students were asked about the frequency of their cooking per week. The responses varied considerably, reflecting the diverse circumstances of the student body. It's likely that factors such as regular use of the cantina, limited

access to cooking facilities, and perhaps a lack of awareness regarding the advantages of cooking contributed to this variety in responses.

This insight underscores the importance of further exploration into students' cooking habits and the factors influencing them. It presents an opportunity to address potential barriers to cooking, such as access to kitchen facilities or education about the benefits of home-cooked meals. By understanding and addressing these factors, universities can better support students in adopting healthier eating habits and empowering them to make informed choices about their nutrition and well-being.

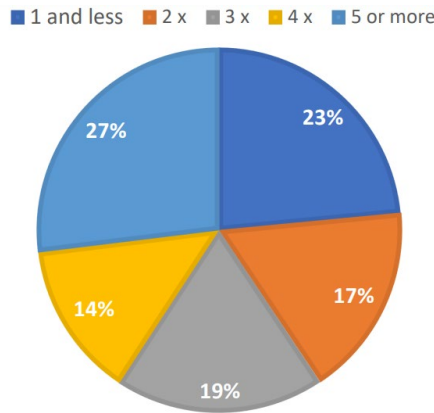


Figure 10: Frequency of cooking per week

In our investigation into nutrition habits, we posed a final question regarding the frequency of ordering take-away food per week. The results showed approximately 80% of students relying on take-away options rarely, once a week or less. We have to be aware that reliance on convenience foods is likely to provide meals of inferior quality compared to home-cooked alternatives.

The prevalence of take-away food or bakery products, sodas, high calorie snacks and sweets consumption underscores the importance of promoting healthier eating practices among students. By providing education about the nutritional value of homemade meals and offering support for cooking at home, universities can empower students to make more informed dietary choices. This approach not only

enhances their overall health and well-being but also cultivates habits that can benefit them long beyond their academic years.

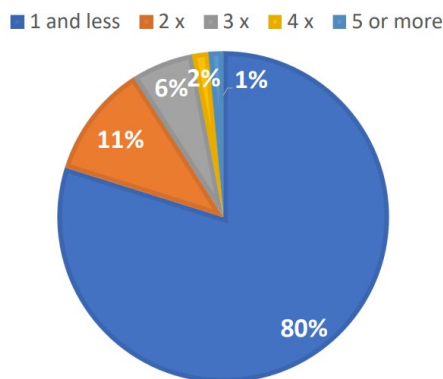


Figure 11: Frequency of ordering take-away food per week

Physical Activity

In our next set of questions focusing on physical activity, students were asked about their access to facilities for exercising at the university. Surprisingly, 30% of respondents indicated that they did not have access to such facilities. This finding raises concerns about the equitable availability of resources to support students' physical well-being on campus.

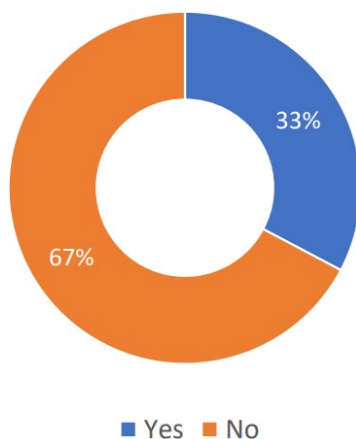


Figure 11: Access to facilities for exercising

Inquiring into students' weekly exercise routines, we found an discouraging trend: only 40% of respondents reported engaging in physical activity more than three times a week. This demonstrates a need for strategies for motivating students to become more active, including beyond the confines of the university campus.

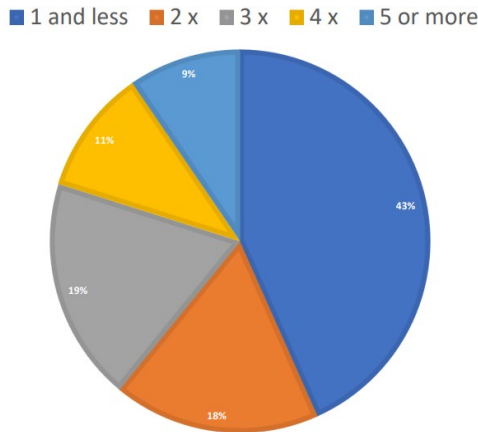


Figure 12: Engaging in physical activity per week

Information access and health

In our next series of questions, we turned our attention to information access, particularly regarding environmental awareness. Reflecting the growing concern for sustainability, students were asked if they were aware that food choices could influence climate change. Surprisingly, a significant majority—72%—demonstrated awareness of this critical connection.

This finding indicates a promising level of environmental consciousness among students, highlighting a growing understanding of the impact of food production and consumption on climate change.

In addition, we inquired about the primary sources from which students obtain information regarding a healthy lifestyle, allowing for multiple selections. The reliability and credibility of these sources are of great importance. Regrettably, the findings revealed that social media, webpages, and online portals emerged as the

predominant sources for such information, since these platforms are often fraught with unreliable or misleading content, influenced by commercial interests.

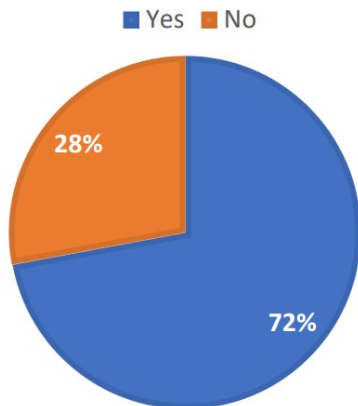


Figure 13: Awareness that food choices could influence climate change

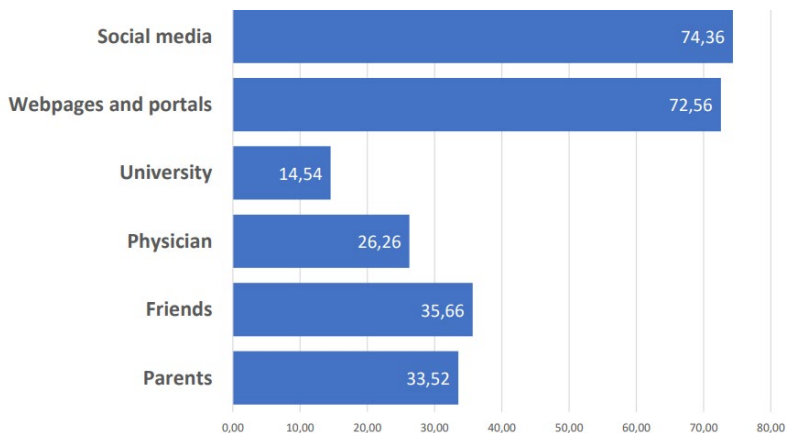


Figure 14: The primary sources of information regarding a healthy lifestyle

In contrast, traditional sources such as physicians and universities, which typically provide evidence-based and trustworthy information, scored lower in terms of being utilized by students. This discrepancy highlights the need for greater efforts to promote reliable sources of information regarding healthy lifestyles, ensuring that students have access to accurate and scientifically sound guidance. By enhancing awareness of credible sources and encouraging critical thinking skills, universities

can empower students to make informed decisions that positively impact their well-being.

In our final question, we sought insights into potential areas for improvement within university programs. Specifically, we asked students if their curriculum included any courses focused on developing healthy lifestyle habits. Surprisingly, nearly 80% of respondents indicated the absence of such courses in their university programs.

This disparity suggests a significant opportunity for universities to enhance their offerings in promoting holistic well-being among students. It's notable that the remaining 20% likely comprised students studying medicine, where education on healthy lifestyle habits is often integrated into the curriculum as a fundamental component.

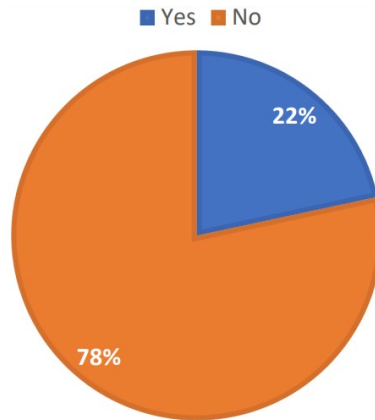


Figure 14: Presence of course at university which focuses on developing healthy lifestyle

4 Discussion

This cross-sectional analysis of 1,533 students from partner countries, primarily Croatia and Slovenia, provides evidence that university life represents a critical period for the development of health-related behaviors (Vadeboncoeur, 2015; Serlachius, 2007). Although the overall median BMI of participants remained within the normal range, the presence of multiple lifestyle-related risk factors suggests a

potential trajectory toward future weight gain and obesity if preventive measures are not implemented (NCD Risk Factor Collaboration, 2024).

A considerable proportion of students lived away from their permanent residence, increasing their responsibility for independent food choices and daily routines, a factor previously associated with suboptimal dietary habits and lifestyle instability (Deliens, 2014; Dejhalla, 2025). Limited access to university cafeterias and exercise facilities, together with low levels of regular physical activity, reflects environmental barriers that have been shown to negatively influence students' health behaviors (Fonderie, 2024; Wang, 2025). Although frequent take-away consumption was not dominant, this does not eliminate the need for structured education on nutrition, cooking skills, and stress management, particularly given the strong association between stress and weight change observed among university populations (Serlachius, 2007; Kozak, 2025).

The near absence of courses addressing healthy lifestyle habits within university curricula highlights a missed opportunity for higher education institutions to actively contribute to obesity prevention and overall well-being (Percheski, 2011; Schäfer, 2021). These findings reinforce the view that universities should function not only as centers of academic development but also as supportive environments for health promotion during early adulthood.

Within this context, the EDU-FIT project presents a targeted and evidence-informed response to the identified gaps. By promoting access to reliable information and encouraging sustainable lifestyle behaviors, EDU-FIT aligns with broader public health recommendations aimed at reducing obesity risk among young adults in the European Union (World Health Organization, 2022; Shimizu, 2025). Strengthening such initiatives may contribute to long-term improvements in student health outcomes and support the development of healthier future generations.

5 Conclusion

University students are a population at increased risk for developing unhealthy lifestyle patterns that may contribute to future obesity and related chronic diseases. Our findings highlight the need for universities to address environmental and educational gaps by improving access to healthy food, physical activity

opportunities, and structured health education. Initiatives such as the EDU-FIT project demonstrate the potential of targeted, evidence-based interventions to support healthier behaviors and long-term well-being among students.

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