

Original Research

Dietary and lifestyle behaviors among Pharmacy students in Kosova

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Received (first version): 16-May-2024

Accepted: 26-Jul-2024

Published online: 22-Jan-2025

Abstract

Background: University students do many mistakes in their nutrition such as taking inadequate unhealthy food and also having an improper lifestyle. Behavioral risk factors, like unhealthy dietary habits, tobacco and alcohol use, physical inactivity may increase the risk of many diseases, as well as this may lead to difficulty in learning. **Objective:** The purpose of this study was to identify the dietary habits and lifestyle practices of pharmacy students, as well as to assess the relationship between nutrition quality, lifestyle and learning in school. **Methods:** A cross-sectional study was conducted from January to February 2024, on a random sample of 162 undergraduate pharmacy students of the University of Prishtina, Kosova. The research instrument was a self-administered questionnaire with questions on the sociodemographic data, anthropometric and medical, questions regarding their dietary and lifestyle behaviors, and also, their year of study and achievement in learning and studying. **Results:** About 85% of students were female and about 15% were male. The average age of the participants was 23.5 years. About 70% of the students had a normal BMI, while 6.2% of them were obese. The average grade of the students was 8.1. Female students ate breakfast more often during the week ($p < 0.05$) around 5 times compared to male students. Within the week 10% of students ate fiber, 20% ate fresh fruit and 14% ate fresh vegetables, while 76% of the them consumed coffee, 14% smoked, 31% consumed alcohol and 53% of students consumed energy drinks. 61% of students practiced physical activity mostly 2 times a week, while 39% of students never practiced any physical activity during the week. In the linear regression analysis with the Enter model, it was seen that BMI ($B: -0.034$, $\%CI: -0.063 - -0.005$), year of studies ($B: -0.197$, $95\%CI: -0.270 - -0.124$), number of dinner meals during the week ($B: -0.043$, $95\%CI: -0.084 - -0.003$), coffee consumption ($B: 0.272$, $95\%CI: 0.023 - 0.522$) and energy drink consumption ($B: -0.338$, $95\%CI: -0.548 - -0.129$) as independent variables had an impact on reducing the average grade of students ($p < 0.05$). **Conclusion:** Pharmacy students had poor adherence to healthy eating and lifestyle habits. Lack of healthy food consumption and lack of physical activity, in the other hand increasing the consumption of fast food and sweets, including coffee, alcohol, tobacco and energy drinks can have detrimental effects on their overall well-being and academic performance.

Keywords: dietary behaviors; lifestyle; university pharmacy students; unhealthy food; physical activity

INTRODUCTION

University students do many mistakes in their nutrition such as taking inadequate unhealthy food and also having an improper lifestyle.^{1,2} Behavioral risk factors, like unhealthy dietary habits, tobacco and alcohol use, physical inactivity may increase the risk of many diseases, as well as this may lead to difficulty in learning.³

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Students in universities have just left their teenage years and are in adulthood. At this stage of their life, they change both in body and mind, as well as in their lifestyle and dietary habits. They change locations, leave their homes for studying and this also affects the way they eat, where they begin to make their own decisions about food and start eating more unhealthy fast food. Also, the busy school schedule may lead them to more snacks and skip of main meals, while the stress and dynamic student life can lead them to other unhealthy habits, such as smoke and alcohol use.⁴⁻⁶

The period during university studies is quite stressful for students who try to achieve academic success regardless of the financial situation, which is very important, as well as at the same time being free from the restrictions imposed by their parents. Such obligations and burdens can influence the development of risky lifestyles, eg, high alcohol and drug consumption and neglect of healthy eating and adequate sleep.⁷ For these reasons, studies of this type are of great importance in the university, because students are known as the healthiest part of the population, and knowing the risk factors that lead them to poor health can help us avoid them.⁸

Eating habits and lifestyle behaviors are adapted from a young age and it is thought that these practices can continue throughout life.^{9,10} The World Health Organization (WHO) has concluded that the health and quality of life of an individual depends mostly on his lifestyle practices.¹¹ These unhealthy



habits, such as poor nutrition and physical inactivity, can lead to chronic diseases that impair health and reduce quality of life, including cardiovascular disease, cancer, obesity, hypertension, and diabetes.^{12,13}

By practicing healthy diet and lifestyle behaviors the reduce of disease mortality rates is very possible, such as having a proper diet, exercising, maintaining the body weight, not smoking or drinking alcohol, and also dealing with stress in a positive way.^{14,15}

Several scientific papers show that better health behaviors related to lifestyle and diet among students are related to increased self-confidence. Those with a normal BMI had more self-confidence than those who were overweight or obese, and this also affected the increase in attention in school and learning.¹⁶⁻¹⁸

The purpose of this study was to identify the dietary habits and lifestyle practices of pharmacy students, as well as to assess the relationship between nutrition quality, lifestyle and learning in school.

MATERIALS AND METHODS

Study design

This is a descriptive cross-sectional study. The study was conducted during the period of four weeks from January to February 2024 academic year at the University of Prishtina, a public university located in Prishtina, Kosova.

Participants

The participants of this study were all undergraduate students of Faculty of Pharmacy, University of Prishtina. The purpose of the study was explained to the students, they were informed about their right to refuse or withdraw from the study without any negative consequences. They were requested to participate in this study by completing a self-administered questionnaire about their dietary and lifestyle habits.

The questionnaire used was adopted and modified from different studies published in this field, and it was validated from all the authors of this study.^{6,13,19-24}

A random sample of 162 Pharmacy students (male and female), between the ages of 18-25 approximately, completed the questionnaire and participated in the survey regarding their dietary and lifestyle behaviors, and also, their year of study and achievement in learning and studying.

In order to achieve better results, students from all years of study, from the first to the fifth year, were included. The five years of Pharmacy studies in the University of Pristina have approx 220 to 230 students in total. About 70 % of the total number of students participated in this study, considering that the participation was purely voluntary.

Data collection

The questionnaire was distributed online and it was self-administered, where pharmacy students had access, and they

voluntarily answered within a period of four weeks during January to February 2024. All their data remained anonymous and confidential. The nature of the survey and the manner in which the responses would be handled were explained to the students of each year by the researchers, as well as they were assured about the confidentiality of the data.

Research instruments

The questionnaire contained 35 questions, which are related to dietary and lifestyle habits, as well as the year of study and the average grade achieved so far. It consists of three parts. In the first part, were presented the questions for data related to gender, age, weight & height, place of residence and the economic status. The second part inquired data about the year of study and the average grade achieved so far. While in the third part were the key questions of the survey, where is requested information about eating habits and physical activity, consumption of breakfast, lunch, dinner, number of snacks, proteins, dairies, fruits, vegetables and fibers, use of alcohol and tobacco, consumption of energy drinks, coffee, unhealthy fast foods, pastries and sweets, use of food supplements, as well as reading the calories at food packaging before consuming, eating when stressed, eating before sleep and hours of sleep per day.

Selection criteria

Only undergraduate and full-time students studying at the Faculty of Pharmacy, University of Pristina were accepted as participants in this study, regardless of the year of study.

Sociodemographic Data

Sociodemographic data includes age, gender (male/female), place of residence (urban/rural) and economic status which was segmented into three categories: low (200-449 Euro), middle (450-699 Euro), high (over 700 Euro), as well as information about the year of study (1-5) and the average grade achieved till now (6-10).

Anthropometric and Medical Data

Anthropometric and Medical data includes weight & height, body mass index (BMI), information on whether students were using food supplements and if yes what kind. Weight & height and BMI data were compared using World Health Organization (WHO) standards for the European population: a BMI < 18.5 kg/m² was categorized as underweight, 18.5–24.9 kg/m² as normal, 25.0–29.9 kg/m² as overweight, and ≥ 30 kg/m² as obese.^{25,26}

Dietary and Lifestyle Behaviors Data

Dietary and Lifestyle Behaviors data includes information regarding the frequency of consumption of breakfast, lunch, dinner, proteins, dairies, fruits, vegetables and fibers in a week, and also the frequency of being physical active. Responses were scored as 1, 2, 3, 4, 5, 6, 7 times a week or never, where higher scores imply more healthful dietary practices.

Responses for consumption of snacks, alcohol and energy drinks were scored as every day, 2-3 times a week, 4-5 per



week, rarely or very rarely, where lower scores imply more healthful dietary practices. Responses for the frequency of consumption of coffee were scored as once a day, 2-3 times a day, 4-5 per day or never, where lower scores imply more healthful dietary practices. Responses for the frequency of consumption of unhealthy fast foods, pastries and sweets were scored as 1, 2, 3, 4, 5, 6, 7 times a week or never, where lower scores imply more healthful dietary practices.

Responses of questions about smoking, eating when stressed and eating before sleep were scored with yes or no, where yes scores mean lower healthful dietary practices while no scores mean higher healthful dietary practices. Whereas about reading the calories at food packaging before consuming, yes response mean higher healthful dietary practices, while no response means lower healthful dietary practices.

Data regarding hours of sleep per day were compared using the recommendation of the American Academy of Sleep Medicine and the Sleep Research Society: adults should sleep between 7 and 9 hours a night because it is important for maintaining optimal health and well-being, for both physical and mental health. Sleeping less than 7 hours a night may have more health issues, which can lead to increased irritability, mood swings, a decreased immune system and a decreased ability to handle stress. Sleeping more than 9 hours a night may negatively impact mental and heart health, which can lead to chronic diseases.²⁷

Statistical analysis

The Statistical Package for the Social Sciences software (SPSS version 21.0) was used for data analysis (IBM, C. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY patent application.). Frequencies (n) and percentages (%) were used to summarise categorical variables, and continuous variables are summarised with mean±standard deviation (SD) or Median and Inter Quartile Rate (IQR). Independent samples t-test and Linear Regression analysis with Enter model were used to compare the mean between the groups and estimation of relationship between the dependent variable (the grade os students) and other independent variables. For all statistical tests, a p-value of <0.05 was considered statistically significant.

Ethical Clearance

The study protocol had been approved by The Ethic Committee of the Faculty of Medicine, University of Prishtina “Hasan Prishtina,” and is fully compliant with the Helsinki Declaration’s provisions on research involving human participants.

RESULTS

From 162 participants of this study, 137 or about 85% were female, while 25 or about 15% were male. The average age of the participants was 23.5 years. Most of the students, about 78%, were living in urban areas and about 66% had a middle economic status. About 70% of the students (114) had a normal weight with an average BMI of 23, and it was more among females (76.6%) than males (36%). 4.9% of the total students were underweight, 18.5% of the students were overweight

and 6.2% of them were obese. Male students were found to be more overweight (52%) and obese (12%) compared to female students with overweight (12.4%) and obesity (5.1%). Most of the students (56), who participated in this study were in the fifth year of studies, 19 were in the fourth year, 29 were in the third year, 40 were in the second year and 18 were in the first year, and the overall average grade of the students in studying so far was 8.1 (8.2 of female students and 7.9 of male students) (Table 1).

Table 1. Socio-demographic, anthropometric, and medical data.

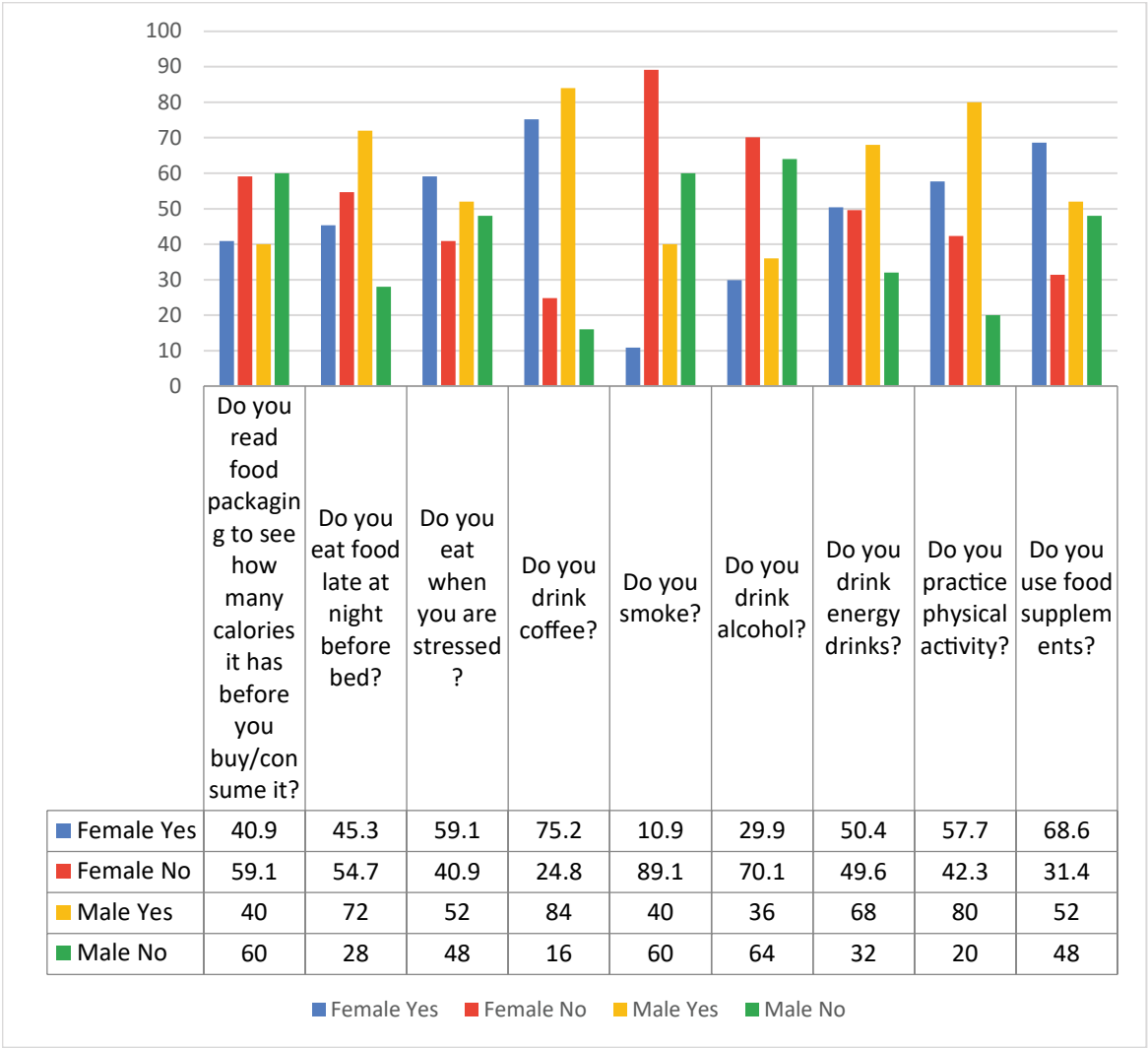
	Total	Female (n=137)	Male (n=25)
	N (%) or Mean±SD or Median (IQR)	N (%) or Mean±SD or Median (IQR)	N (%) or Mean±SD or Median (IQR)
Age	23.5±3.9	23.5±3.9	23.6±4.0
Residence			
Urban	127(78.4)	105(76.6)	22(88.0)
Rural	35(21.6)	32(23.4)	3(12.0)
Weight	66.1±12.7	63.0±10.1	83.1±12.2
Height	169.2±7.8	167.4±6.6	178.8±6.8
BMI			
<18.5	8(4.9)	8(5.8)	0(0.0)
18.5-24.9	114(70.4)	105(76.6)	9(36.0)
25.0-29.9	30(18.5)	17(12.4)	13(52.0)
≥30	10(6.2)	7(5.1)	3(12.0)
Economic status			
Low	0(0.0)	0(0.0)	0(0.0)
Middle	107(66.0)	91(66.4)	16(64.0)
High	55(34.0)	46(33.6)	9(36.0)
Year of study			
First year	18(11.1)	13(9.5)	5(20.0)
Second year	40(24.7)	37(27.0)	3(12.0)
Third year	29(17.9)	22(16.1)	7(28.0)
Fourth year	19(11.7)	17(12.4)	2(8.0)
Fifth year	56(34.6)	48(35.0)	8(32.0)
Average grade	8.1±0.7	8.2±0.7	7.9±0.8
How many times a week do you practice physical activity?	2.0(0.0-3.2)	1.0(0.0-3.0)	4.0(1.0-5.0)

Students declared that they slept an average of 7.4 hours a day. Female students ate breakfast more often during the week (p<0.05) around 5 times compared to male students. While male students had more habits to have lunch and dinner compared to female students. Female students ate more fresh fruits and vegetables around 5 times a week compared to male students. About 3 times a week students ate fast food and pastries. Compared to male students, female students received on average more protein, fiber and sweets during the week, and also drank more milk and ate dairy products (Table 2). During the seven days of the week, only 42% of the students ate breakfast, 65% ate lunch, 56% ate dinner, 13% ate protein, 43% ate sweets, 5% ate fast food, 7% ate pastries, 10% ate fiber, 20% ate fresh fruit, 14% ate fresh vegetables and 14% drank milk and ate dairy products every day.

Graph 1 presents the prevalence of lifestyle behaviors data



Table 2. Dietary data compared by gender.				
	Total	Female	Male	
	Mean±SD	Mean±SD	Mean±SD	
How many hours a day do you sleep?	7.4±1.0	7.4±1.0	7.5±0.9	t=0.318, p=0.752
How many times a week do you eat breakfast?	4.6±2.5	4.8±2.5	3.0±2.3	t=3.534, p=0.001
How many times a week do you eat lunch?	5.3±2.6	5.2±2.7	5.9±1.6	t=1.672, p=0.100
How many times a week do you eat dinner?	5.1±2.5	5.1±2.6	5.3±2.1	t=0.436, p=0.665
How many times a week do you eat protein?	3.8±2.0	3.9±2.0	3.4±1.8	t=1.272, p=0.212
How many times a week do you eat sweets?	5.1±2.0	5.3±2.0	4.1±1.9	t=2.846, p=0.007
How many times a week do you eat fast food?	3.1±1.7	3.1±1.8	3.0±1.6	t=0.326, p=0.747
How many times a week do you eat pastries?	2.8±1.7	2.8±1.7	2.8±1.6	t=0.090, p=0.929
How many times a week do you eat fiber?	3.4±1.8	3.6±1.8	2.8±1.5	t=2.405, p=0.021
How many times a week do you eat fresh fruits?	4.3±1.9	4.4±1.9	3.8±1.8	t=1.459, p=0.153
How many times a week do you eat fresh vegetables?	3.7±1.9	3.7±1.9	3.3±1.7	t=1.157, p=0.255
How many times a week do you drink milk and/or eat dairy products?	3.4±2.1	3.4±2.2	2.9±1.5	t=1.423, p=0.162



Graph 1. The prevalence of lifestyle behaviors data compared by gender (%).



compared by gender. 41% of students read the food packaging to see how many calories it has before buying and consuming it. 49% of students where 72% of them were male declared that they eat food late at night before going to bed. 58% of students, 59 % of them female claimed to consume food when they are stressed. 76% of the students, where 84% of them were male and 75% female consumed coffee. Regarding the question of how many times a day 37% of students consumed 2-3 coffees a day, where almost half of male students (48%) consumed 2-3 coffees a day. 14% of students 40% of them male smoked cigarettes, while 89% of female students do not smoke. 31% of students 36% of them male consumed alcohol. 53% of students 68% of them male consumed energy drinks. 66% of students 69% of them female use food supplements. 61% of students, where 80% of them were male and about 58% female students practiced physical activity, although in table 1 we can see that they practice physical activity only 2 times a week. 39% of students declared that they never practiced any physical activity during the week, while only about 4% of students declared that they practiced physical activity 7 times a week.

Graph 2 presents the prevalence of consuming snacks, alcohol and energy drinks, where 32% of students claimed to eat snacks every day, whereas 18.5% of them claimed to eat snacks rarely, while 62% stated that they rarely consume alcohol or energy drinks.

The most frequent supplements used by students were vitamins with 49%, the second most used were multivitamins and multiminerales with 20%, following by fish oil 8%, proteins about 6%, probiotics 2.5 %, while 1.9 % of students declared that they don't use food supplements (Graph 3).

In the linear regression analysis with the Enter model, it was seen that BMI (B: -0.034, %CI: -0.063 - -0.005), year of studies (B=-0.197, 95%CI: -0.270 - -0.124), number of dinner meals during the week (B=-0.043, 95%CI: -0.084- -0.003), coffee consumption (B:0.272, 95%CI:0.023 - 0.522) and energy drink consumption (B:-0.338, 95%CI :-0.548 - -0.129) as independent variables had an impact on reducing the average grade of students ($p<0.05$), where for each unit of increase in these variables, we have a decrease in the average grade (Table 3).

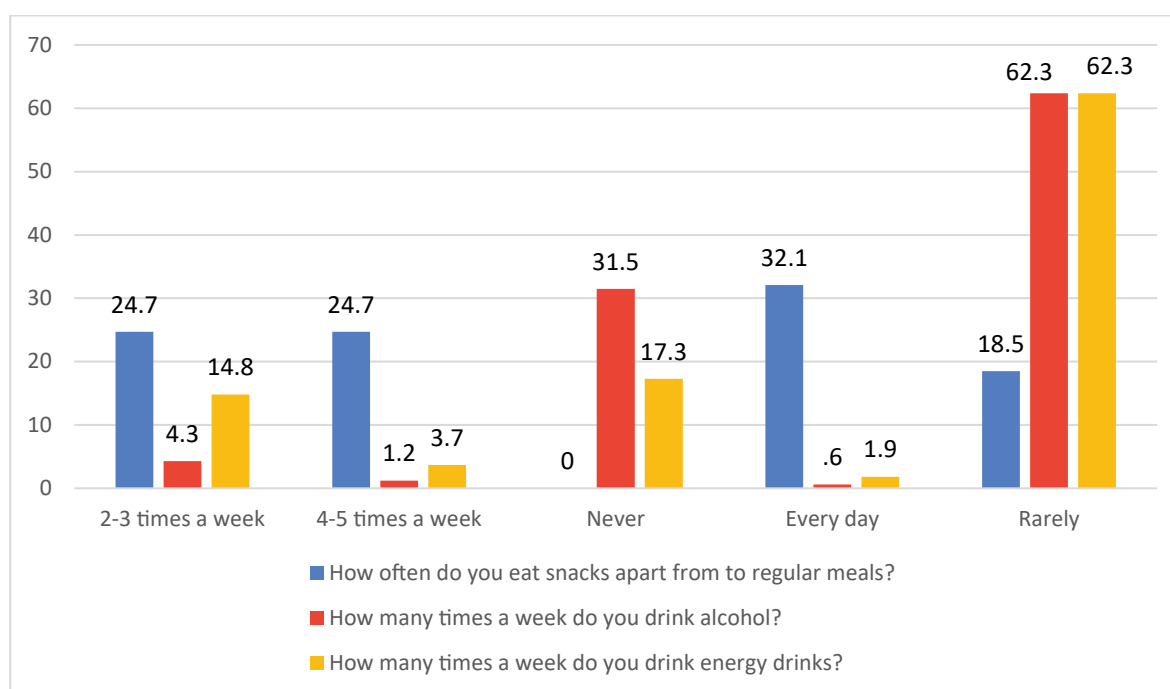
DISCUSSIONS

In this study we aimed to identify the dietary habits and lifestyle practices of pharmacy students, as well as to assess the relationship between nutrition quality, lifestyle and learning in school through their average grade achieved so far.

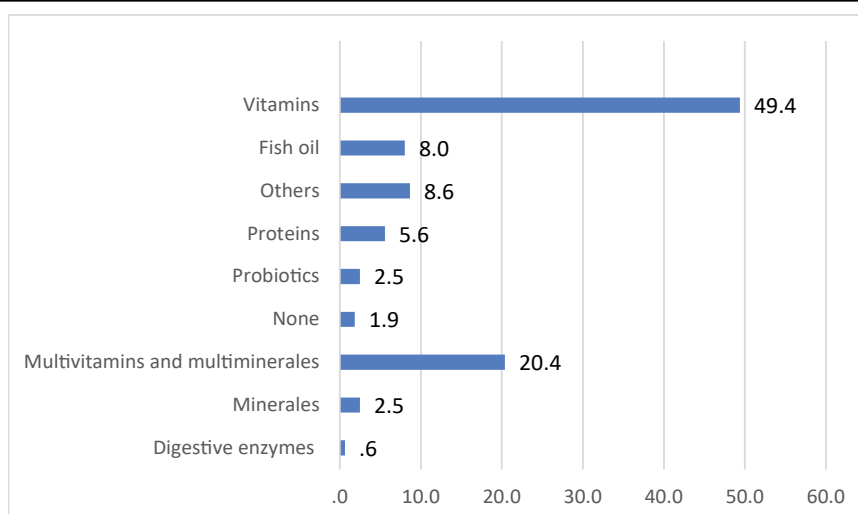
The majority of our sample consisted of female students (85%). Our findings corresponded with some other works, which shows that Faculty of Pharmacy is more liked by this gender in many countries of the world, not only in our country.^{6, 17, 28-31}

Most of our students, about 70% had a normal weight with an average BMI of 23, however about 6% of them were obese, and this is related to our other findings that 58% of students claimed to consume food when they are stressed, whereas 49% of students declared that they eat food late at night before going to bed. Other studies as well shown changes in weight and body composition in university students, where those with increased BMI had potential to gain a significant amount of weight compared to students with normal BMI.^{4, 32-34}

During this research, we noticed that pharmacy students do not adhere to diets and eating habits. Our findings are in line



Graph 2. The prevalence of consuming snacks, alcohol and energy drinks (%).



Graph 3. The prevalence of using food supplements (%).

Table 3. The linear regression analysis of the impact on average grade

Model B	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	Std. Error	Beta				Lower Bound	Upper Bound
(Constant)	9.779	.394		24.850	.000	9.001	10.556
BMI	-.034	.015	-.167	-2.326	.021	-.063	-.005
Year of study	-.197	.037	-.391	-5.326	.000	-.270	-.124
How many times a week do you eat dinner?	-.043	.021	-.151	-2.098	.038	-.084	-.003
Do you drink coffee?	.272	.126	.159	2.154	.033	.023	.522
Do you drink energy drinks?	-.338	.106	-.232	-3.190	.002	-.548	-.129

Dependent Variable: Average grade so far

with previous studies indicating that pharmacy students, may adopt less healthy behaviors or consume more unhealthy food. The rigorous academic schedule and stress of coursework and exams can lead to poor dietary choices, irregular eating habits, and a lack of physical activity among students. Factors such as time constraints, convenience, and limited access to nutritious food options may contribute to this trend. Additionally, the culture of academic pressure and competition can sometimes prioritize studying over self-care practices like healthy eating and exercise.^{6, 21, 35-38}

A statistically significant difference ($p < 0.05$) was found between male students who commonly skipped breakfast more compared to female students who were more regular in their breakfast consumption in a week. Within the seven days of the week the consumption of protein, fiber, fresh fruits and vegetables, milk and/or dairy products were very low, such as 1 or max 2 fruits and/or vegetables throughout the day. These data are closely related to students' place of residence and their economic status. About 78% of students lived in urban areas near the school and far from their families, and this makes them not to respect the food meals, but to eat more fast food. Also, about 66% of them had a middle economic status, which means that they do not have enough income to constantly

eat healthy foods, proteins, fresh fruits and vegetables, but they always turn to fast foods that are also cheaper. Leaving the family home and taking responsibility for preparing and buying food can be seen that has negatively influenced their eating habits. Similar to our findings, several studies concluded that students who lived at home did not show major changes in their eating habits since starting university, while students who lived away from home and family decreased their weekly consumption of fresh fruits and vegetables, fish and seafood, and increased their intake of sugar, wine, alcohol and fast food.³⁹⁻⁴¹

During the seven days of the week, we have noticed irregularities in lifestyle behaviors too, where the daily consumption of coffee (76%), sweets (43%), pastries (7%), snacks (32%), alcohol (31%), energy drinks (53%) and smoking (14%) was high, while regarding to fast food, about 5% of students ate every day and about 24% of them ate fast food 3 times a week.^{42, 43} Consuming fast food so often is associated with higher risk of weight gain and obesity and also is the main barrier to adopting a healthy diet.⁴⁴ We have found excessive daily consumption of coffee and energy drinks among pharmacy students which is similar to other studies too.^{45, 46}

Alcohol consumption among students is a problem that is constantly spreading on university campuses, being then accompanied by smoking, and it is thought that stress during university time may be a contributing factor in the initiation of these habits. Our results were resembling with the results of a study that showed that half of the students (49.63%) drank alcohol occasionally and 34.74% of the participants did not drink alcohol, while most of the students did not smoke at all (69.40%), and only 16.67% of them were current smokers.²⁹ Similar results were also identified by other studies on medical students.⁴⁷⁻⁴⁹ The findings of our study show that the rate of alcohol consumption and smoking is higher among male students compared to female students. Other studies also have received similar results.⁵⁰⁻⁵² The higher rates of alcohol consumption and smoking among male students compared to female students can be influenced by a combination of biological, psychological, social, and cultural factors. Some potential reasons are social status, attractiveness and peer influence, coping mechanisms for stress, where male students are more likely to rely on substances like alcohol and tobacco to manage stress, and also marketing and advertising of alcohol and tobacco products that often target male consumers, portraying these substances as symbols of masculinity.⁵³

Even though 61% of students claimed that they practiced physical activity, the average number of days was only 2 times a week. 39% of students declared that they never practiced any physical activity during the week, while only about 4% of students declared that they practiced physical activity 7 times a week. Possible reasons why students do not exercise regularly include the heavy load of studying at the faculty and at home and the long time they spend during the day at the university. The lack of suitable facilities for training is also an important reason why students do not practice physical activity. High prices and difficult access to sport facilities, fitness centers and swimming pools are also other reasons. On the other hand, the spread of computers and internet services provides different entertainment for students, reducing their interest in exercise and sport activities.^{8, 54, 55}

41% of students stated that they read food packaging to see how many calories it has before buying and consuming it. There was an interesting connection here that these students who declared that they read the food packaging also consumed more often fruits, vegetables, protein, fiber, milk and did not skip meals compared to those who did not declare.^{45, 46} This question can also be linked to knowledge of pharmacy students about nutrition and healthy food. Compared to other non-pharmacy/medical students and the general population, pharmacy students have more knowledge about nutrition and are more inclined to eat healthy, they are also careful to choose their food products. It should also be taken into account that the majority of pharmacy students are female and they are always more careful to maintain their body shape, because of their desire to have a thinner figure comparing to male. But, due to the fact that they do not have much free time and have a very busy schedule time table with lessons, they are not respecting the rules of healthy eating. Some studies have given similar interesting results showing that even though pharmacy

students had good knowledge about healthy food, it was not enough to stimulate them to practice healthy habits.^{56, 57}

There is a high rate of consumption of food supplements by students (66%), where the most used supplements were vitamins (49%), then multivitamins and multiminerals (20%), followed by fish oil (8%), proteins (6%), probiotics (2.5%), while only 1.9% of students declared that they do not use food supplements. These results are in line with others studies.^{2, 58-60} The high use of food supplements among pharmacy students is also thought to be related to their knowledge about the importance of nutritional status and their ability to assess the fact that skipping meals or consuming unhealthy foods leads to unbalanced nutrition with negative health consequences.^{61, 62}

Students declared that they slept an average of 7.4 hours a day, where according to the recommendations of the American Academy of Sleep Medicine and the Sleep Research Association (7-9 h), they sleep enough hours to maintain physical and mental health.²⁷ But our results do not correspond with the results of some researches where authors found that the average sleep duration of students was 6.7 h and they did not reach the minimum number of 7 h of sleep a day during the week.^{63, 64} There were no statistical differences regarding gender about the number of hours of sleep per night.

Starting from the average grade of the students (8.1) and the data we have obtained regarding the quality of nutrition and lifestyle we have analyzed the possible connections between them. We have measured the impact of all parameters on the students' average grade. It was seen that BMI (B: -0.034, %CI: -0.063 - -0.005), year of studies (B=-0.197, 95%CI: -0.270 - -0.124), number of dinner meals during the week (B=-0.043, 95%CI: -0.084 - -0.003), coffee consumption (B:0.272, 95%CI:0.023 - 0.522) and energy drink consumption (B:-0.338, 95%CI :-0.548 - -0.129) as independent variables had an impact on reducing the average grade of students ($p<0.05$). This shows that the increase of these factors may have a negative impact on students' academic performance because for each unit of increase in these variables, we have a decrease in the average grade. BMI is an indicator of overall health and lifestyle habits, where higher BMIs presents poorer dietary habits or less physical activity, which could potentially impact academic performance negatively. Year of studies could influence performance due to factors like increased workload, familiarity with study habits, or changes in personal circumstances. Number of dinner meals during the week could lead to poor nutrition, affecting concentration and energy levels, thereby impacting academic performance. Coffee and energy drinks have caffeine which can influence alertness and concentration, but excessive consumption could lead to jitteriness, insomnia, or dependency, potentially affecting academic performance negatively.⁶⁵⁻⁶⁷

Strength and Limitations of the Study

The strength of this study lies in its novelty and uniqueness as such work has not been explored before among the students of the Faculty of Pharmacy in Kosova, even such a study has not been conducted among the students of other faculties in our country. This exclusivity, as being the first of its kind, increases



the importance and impact of the study, as it fills a substantial gap in the existing literature, and also has the potential to provide valuable insights and contribute to the advancement of knowledge in this field locally and globally.

During the research and compilation of this study, we identified some limitations. The first limitation is that the number of female students is much greater than the number of male students, and this makes the sample imbalanced. Usually in Kosova, the Faculty of Pharmacy is always more preferred by female students than male students.

The second limitation is that only students of the Faculty of Pharmacy of the University of Pristina, which is a public university, participated in this study. Students from other Kosova universities, public or private, did not participate, therefore, the results cannot be generalized to all pharmacy students in Kosova. A larger sample number would provide us with a clearer picture regarding their diet and lifestyle.

Our third limitation is that the psychological state of students was not analyzed, such as the presence of any depressive symptoms or any psychiatric illness. These factors can influence dietary habits, such as strange preferences for specific foods due to positive memories associated with them and self-rewarding eating as the primary coping mechanism for managing emotions or stress.

In further research, these limitations should be considered in order to achieve more accurate results.

CONCLUSIONS

After the analysis done and the results obtained, we can come to the conclusion that pharmacy students had poor adherence to healthy eating and lifestyle habits. Lack of healthy food consumption and lack of physical activity, in the other hand increasing the consumption of fast food and sweets, including coffee, alcohol, tobacco and energy drinks can indeed have

detrimental effects on their overall well-being and academic performance.

Understanding these findings can be pivotal in implementing targeted interventions and educational programs to promote healthier lifestyles among pharmacy students. Encouraging access to nutritious food options, promoting regular exercise, and raising awareness about the negative effects of excessive consumption of fast food, coffee, alcohol, tobacco, and energy drinks could be steps toward fostering healthier habits within the student community. Additionally, providing support systems and resources for stress management and time management could also contribute to overall well-being and academic success.

AUTHORS' CONTRIBUTION

ZI and DS were observing this research project, had full access of this study's data, in the meantime they took responsibility to show integrity for the data.

Study Design: ZI, DS, IM

Instruction on the use of instruments for the outcome measures used in this study: AM, IM

Analysis and interpretation of data: ZI, BT

Manuscript preparation: ZI, AM

Statistical Analysis: BT

DISCLOSURE STATEMENT

No competing financial interests exist for all authors.

AVAILABILITY OF DATA

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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