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ORIGINAL ARTICLES

# Lifestyle Behaviors and Health Risk Factors among Medical Students in Tirana: Potential Implications for Injury Risk and Impaired Performance

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## ABSTRACT

**Background:** Medical students are exposed to intensive academic schedules, high stress, and irregular daily routines, which may affect lifestyle behaviors. Unhealthy diet, low physical activity, inadequate sleep, and high stress can impair physical and cognitive performance and increase the risk of accidental injuries due to fatigue.
This study aims to assess lifestyle behaviors and health risk factors among medical students in Tirana and to examine their potential implications for academic performance and injury risk.
**Materials and Methods:** This was a descriptive-analytical, cross-sectional, observational study including 213 students from the University of Medicine in Tirana. Data were collected through a structured online questionnaire (Google Forms). Descriptive statistics summarized sample characteristics, while Spearman's correlation and logistic regression were used to examine associations between variables. Statistical significance was set at $p \leq 0.05$.
**Results:** A total of 213 medical students participated, with a mean age of 20.2 ± 1.5 years and mean BMI of 22.6 ± 3.4 kg/m². Breakfast skipping (35.2%), insufficient fruit and vegetable consumption, insufficient sleep (≤6 h/night, 60.6%), and high academic stress were common. Only 24.9% reported daily physical activity. Health-promoting behaviors clustered together, with physical activity positively associated with regular breakfast, adequate sleep duration, and daily fruit consumption ($p < 0.01$). Conversely, unhealthy dietary patterns and insufficient sleep clustered and were linked to adverse health outcomes. Logistic regression confirmed physical activity, fruit consumption, and adequate sleep as protective factors ($p \leq 0.05$).
**Conclusions:** Unhealthy lifestyle behaviors are common among medical students in Tirana. Irregular meals, poor dietary quality, low physical activity, and insufficient sleep may impair cognitive and physical performance and increase the risk of negative health outcomes. Targeted interventions and a purpose-built campus promoting healthy eating, exercise, and stress management are recommended to support student well-being.
**Keywords:** Lifestyle behaviors; Medical students; Health risk factors; Injury Risk

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## INTRODUCTION

Lifestyle behaviors established during young adulthood are critical determinants of current health status and long-term physiological and psychological outcomes. Nutritional patterns, levels of physical activity, sleep duration and quality, stress exposure, and substance use are well-established determinants of physical and mental health. These determinants are closely associated with the risk of developing non-communicable diseases, neurocognitive impairment, and increased vulnerability to injury (1,3). During this life stage, unhealthy behaviors often emerge or consolidate, potentially persisting into adulthood and contributing to cumulative health risks.

Medical students represent a vulnerable population with respect to lifestyle-related health risks. The demands of medical education, including intensive academic workloads, extended study hours, sleep deprivation, and psychological stress, often constrain opportunities for healthy dietary, regular physical activity, and sufficient rest (4,15).

Previous research has consistently documented high rates of breakfast skipping, poor diet quality, inadequate physical activity, and elevated stress levels among medical students (6-13).

These behaviors compromise physical health and may also impair cognitive functions, including attention, decision-making, and reaction time, which are essential for academic performance and clinical competence.

Sleep deprivation and chronic stress have been shown to negatively affect cognitive function, emotional regulation, and psychomotor performance, thereby increasing the risk of errors, accidents, and injuries (2,9).

In addition, unhealthy dietary habits and low levels of physical activity may contribute to weight imbalance, fatigue, and diminished physical capacity. Substance-related behaviors, including excessive caffeine intake, alcohol consumption, and smoking, often cluster with other unhealthy lifestyle habits, potentially amplifying health risks and compromising overall performance (3,7).

Although international research on lifestyle behaviors among medical students is expanding, data from Albania are limited. Assessing the prevalence and interrelationships of lifestyle behaviors and associated health risk factors in this population is essential for informing targeted health promotion strategies within medical universities in Tirana. Additionally, from a trauma and emergency medicine perspective, identifying modifiable behaviors that may compromise performance and increase injury risk is critical for the training of future healthcare professionals.

Accordingly, this study assessed lifestyle behaviors and health risk factors among medical students at the University of Medicine in Tirana and explored their potential implications for health status, impaired performance, and injury risk. By examining dietary habits, physical activity, sleep patterns, stress, substance use, and their associations with health outcomes, the study aims to provide evidence to inform preventive interventions and institutional policies that enhance student well-being and safety.

## MATERIALS AND METHODS

### Study Design

This study was designed as an analytical, observational, cross-sectional investigation conducted among students enrolled at the University of Medicine in Tirana. A cross-sectional design was selected as it allows for the simultaneous assessment of lifestyle behaviors and health-related risk factors within a defined population at a specific point in time.

### Study Population and Sample Size

The study was conducted between January and March 2025 at the University of Medicine in Tirana, Albania. The target population included students from all academic years and study programs, including General Medicine, Pharmacy, Dentistry, Public Health, and Nursing. A total of 500 students were invited to participate in the study. Before participation, students were informed about the study objectives, the voluntary nature of participation, and data confidentiality, and they could withdraw at any time without consequences. After applying the inclusion criteria, 213 completed questionnaires were considered valid and included in the final analysis.

### Sampling Procedure

A convenience sampling method was employed. The questionnaire was distributed electronically via Google Forms and disseminated through official academic communication channels and student groups. This approach was selected to maximize accessibility and facilitate participation across various study programs and academic years.

### Data Collection Instrument and Study Variables

Data were collected using a structured, anonymous, self-administered questionnaire developed specifically for this study to assess lifestyle behaviors and health-related risk factors among medical university students, in line with the study objectives. The questionnaire was administered online via Google Forms.

Only variables directly related to the study theme were included in the analysis. Sociodemographic variables comprised age, gender, study program, and year of study, which were used to describe the study population.

Lifestyle behavior variables included dietary habits and frequency of consumption of food groups (fruits, vegetables, sweets, fast food, and sugar-sweetened beverages), meal patterns (regularity of breakfast, lunch,

and dinner), eating at home during the week, and physical activity (frequency, duration, and type of activity).

Health-related risk factors included sleep duration and sleep-related problems, perceived academic stress, and coping strategies for stress management. Behavioral risk variables also included the consumption of alcohol, tobacco products, caffeine-containing beverages, and other substances.

Anthropometric variables included self-reported height and weight, which were used to calculate body mass index (BMI) and satisfaction with current weight. BMI was classified according to the World Health Organization

Organization (WHO) criteria and was considered a key health-related outcome variable. Additional outcome variables included self-rated health status and satisfaction with body weight.

### Statistical Analysis

Data were analyzed using IBM SPSS Statistics, version 27. Descriptive statistics were used to summarize the study variables, including means, standard deviations (SD), frequencies, percentages, and confidence intervals (CI), where appropriate. The normality of data distribution was assessed before inferential analysis. Spearman's rank correlation coefficient was used to examine associations between continuous and ordinal variables. Logistic regression analysis was conducted to assess the association between selected lifestyle risk factors and health outcomes. Results were presented as odds ratios (OR) with p-value. A p-value of $\leq 0.05$ was considered statistically significant.

### Ethical Considerations

The study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval for the study and the questionnaire was obtained from Assoc. Prof. Loreta Kuneshka. All participants provided informed consent before participation. Participation was voluntary, the questionnaire was anonymous, and all collected data were treated with strict confidentiality and used exclusively for research purposes.

## RESULTS

### Socio-Demographic, Anthropometric Data

The study included 213 medical university students from the University of Medicine in Tirana. The majority of participants were female (78.9%, n = 168). The median age group was 18–21 years, with a mean age of 20.2 ± 1.51 years. Participants were distributed across academic years as follows: 5.2% in the first year, 58.7% in the second year, 13.6% in the third year, 16.9% in the fourth year, 1.9% in the fifth year, and 3.8% in the sixth year. Most students were enrolled in the General Medicine program (96.2%, n = 205), with the remaining 3.8% (n = 8) participating in other study programs.

The mean BMI was 22.63 kg/m² (SD ± 3.40), with a range from 16.5 to 36.6 kg/m² and a 95% confidence interval of 22.17 to 23.09 kg/m². Male students had a higher average BMI (24.75 kg/m²) than female students (22.06 kg/m²). BMI increased slightly with age: students aged 18–21 years averaged 22.67 kg/m², those aged 22–24 years averaged 22.25 kg/m², and those aged 25–27 years averaged 24.95 kg/m². Most students (69.8%) had a normal BMI (18.5–25 kg/m²), while 23.1% were classified as overweight or obese (BMI >25 kg/m²), and 7.1% were underweight (BMI <18.5 kg/m²). Over half (54.9%) of participants reported satisfaction with their current weight. These results indicate that although the majority maintained a healthy weight, a notable minority were overweight or underweight, underscoring the need for targeted health and lifestyle interventions. Sociodemographic and anthropometric characteristics are presented in Tables 1 and 2 and in Graph 1.

### Lifestyle Behaviors and Health Risk Factors

Of the 213 medical students, 35.2% reported rarely or never consuming breakfast, while daily fruit and vegetable consumption rates were 41.3% and 37.1%, respectively. Fast food consumption at least once per week was highly prevalent (85.9%). Only 24.9% engaged in daily physical activity, and 60.6% reported sleeping six hours or less per night. Frequent stress was reported by 57.7% of participants. Substance use was relatively low, with 56.3% abstaining from alcohol and 82.2% from tobacco. These findings indicate a clustering of suboptimal lifestyle behaviors associated with increased health risks. Detailed distributions are provided in Table 3.

### Correlations Among Lifestyle Behaviors and Health Risk Factors

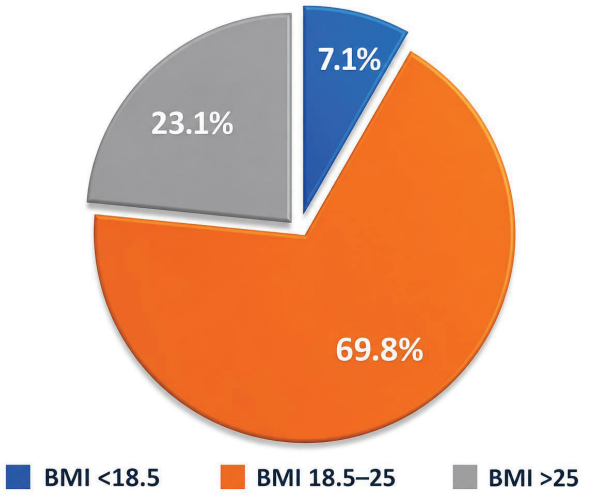
To examine associations among lifestyle behaviors, Spearman correlation analyses were performed. Physical activity was strongly correlated with moderate-to-vigorous activity ($r = 0.63$, $p < 0.01$) and showed positive associations with regular breakfast consumption ($r = 0.24$, $p < 0.01$) and fruit consumption ($r = 0.19$, $p < 0.01$). Students with higher activity levels also reported long sleep duration ($r = 0.20$, $p < 0.01$). These findings indicate clustering of health-promoting behaviors, with physically active students more likely to maintain regular meal patterns and to consume adequate amounts of fruit, potentially supporting optimal cognitive and physical performance. Detailed correlations are summarized in Table 4.

**Table 1.** Sociodemographic Characteristics of the Study Participants (N = 213)

| Variable | Category | Absolute Number (n) | Percentage (%) |
|---|---|---|---|
| Gender | Male | 45 | 21.1 |
| | Female | 168 | 78.9 |
| Age group | 18-21 years old | 172 | 80.8 |
| | 22-24 years old | 38 | 17.8 |
| | 25-27 years old | 3 | 1.4 |
| Study program | General Medicine | 205 | 96.2 |
| | Other | 8 | 3.8 |
| Year of study | Year 1 | 11 | 5.2 |
| | Year 2 | 125 | 58.7 |
| | Year 3 | 29 | 13.6 |
| | Year 4 | 36 | 16.9 |
| | Year 5 | 4 | 1.9 |
| | Year 6 | 8 | 3.8 |
| **Total Students** | | 213 | **100** |

**Table 2.** Descriptive Statistics for BMI

| Statistics | | Value |
|---|---|---|
| Sample size (n) | | 213 |
| Mean (Average) | | 22.63 kg/m² |
| Standard Deviation | | ± 3.40 kg/m² |
| Minimum | | 16.5 |
| Maximum | | 36.6 |
| 95% Confidence Interval | | 22.170 – 23.091 kg/m² |
| BMI | Male | 24.75 kg/m² |
| | Female | 22.06 kg/m² |
| BMI by Age Group | | |
| 18-21 years old | | 22.67 kg/m² |
| 22-24 years old | | 22.25 kg/m² |
| 25-27 years old | | 24.95 kg/m² |




**Graphic 1.** BMI Classification Among Medical Students

**Table 3:** The lifestyle behaviors and health risk behaviors of the study participants (N = 213)

| Variable | Category | n | % |
|---|---|---|---|
| Breakfast frequency | Every day | 92 | 43.2 |
| | 3–4 times/week | 46 | 21.6 |
| | Rarely/Never | 75 | 35.2 |
| Lunch frequency | Every day | 195 | 91.5 |
| | 3–4 times/week | 15 | 7.0 |
| | Rarely/Never | 3 | 1.5 |
| Dinner frequency | Every day | 146 | 68.5 |
| | 3–4 times/week | 43 | 20.2 |
| | Rarely/Never | 24 | 11.3 |
| Eating at home during the week | Yes | 183 | 85.9 |
| Fruit consumption (daily) | Daily | 88 | 41.3 |
| Sweets | >3–4 times/week | 114 | 53.6 |
| Vegetable consumption (daily) | Daily | 79 | 37.1 |
| Fast food consumption (≥1/week) | 1+ per week | 183 | 85.9 |
| Daily physical activity | Yes | 53 | 24.9 |
| Moderate/heavy activity ≥3 times/week | Yes | 46 | 21.6 |
| Sleep ≤6 h/night | Yes | 129 | 60.6 |
| Sleep problems | Yes | 76 | 35.7 |
| Perceived stress (often) | Yes | 123 | 57.7 |
| Main stress management: exercise, running, yoga | Yes | 38 | 17.8 |
| Dissatisfaction with weight | Some/Not satisfied | 96 | 45.1 |
| Self-rated health: fair/ poor | Yes | 11 | 5.2 |
| Carbonated drinks | Never | 80 | 37.6 |
| | 1-2 times/ week | 86 | 40.4 |
| | ≥3 times/ week | 47 | 22.1 |
| Coffee | Never | 85 | 39.9 |
| | 1-2 times/ week | 31 | 14.6 |
| | ≥3 times/ week | 97 | 45.5 |
| Energy drinks | Never | 107 | 50.2 |
| | 1-2 times/ week | 58 | 27.2 |
| | ≥3 times/ week | 48 | 22.6 |
| Alcohol consumption | Never | 120 | 56.3 |
| | 1-2 times/ week | 10 | 4.7 |
| | Rarely | 83 | 39 |
| Tobacco use (cigarettes/e-cigarettes) | Never | 175 | 82.2 |
| | 1-2 times/ week | 3 | 1.4 |
| | Rarely | 23 | 10.8 |
| | Every day | 12 | 5.6 |
| Drug use | Never | 206 | 96.7 |
| | Occasionally/ Rarely | 7 | 3.3 |

**Table 4.** Lifestyle Behaviors Matrix

| Variable | Physical activity (h/week) | Moderate-vigorous PA | Sleep duration | Regular breakfast | Fruit consumption |
|---|---|---|---|---|---|
| Physical activity (h/week) | 1 | 0.63** | 0.20** | 0.24** | 0.189** |
| Moderate-vigorous PA | 0.63** | 1 | 0.13* | 0.26** | 0.193** |
| Sleep duration | 0.20** | 0.13* | 1 | 0.19** | ns |
| Regular breakfast | 0.24** | 0.26** | 0.19** | 1 | 0.23** |
| Fruit consumption | 0.189** | 0.193** | ns | 0.23** | 1 |

Footnote: * $p < 0.05$ ** $p < 0.01$ ns = not significant

**Table 5.** Health Risk Factors Matrix

| Variable | Perceived stress | Sleep problems | Alcohol use | Smoking | Drug use | Energy drinks | Fast food consumption | Carbonated drinks | Coffee |
|---|---|---|---|---|---|---|---|---|---|
| Perceived stress | 1 | 0.25** | 0.17* | 0.14* | 0.19** | ns | ns | ns | ns |
| Sleep problems | 0.25** | 1 | ns | ns | ns | 0.16* | 0.16* | ns | ns |
| Alcohol use | 0.17* | ns | 1 | 0.43** | 0.15* | 0.18** | ns | 0.17* | 0.2** |
| Smoking | 0.14* | ns | 0.43** | 1 | 0.4** | ns | ns | ns | 0.2** |
| Drug use | 0.19** | ns | 0.15* | 0.4** | 1 | ns | ns | ns | ns |
| Energy drinks | ns | 0.16* | 0.18** | ns | ns | 1 | 0.4** | 0.6** | 0.23** |
| Fast food consumption | ns | 0.16* | ns | ns | ns | 0.4** | 1 | 0.3** | ns |
| Carbonated drinks | ns | ns | 0.17* | ns | ns | | 0.3** | 1 | 0.2* |
| Coffee | ns | ns | 0.2** | 0.2** | ns | 0.2** | ns | 0.2* | 1 |

Footnote: * $p < 0.05$ ** $p < 0.01$ ns = not significant

In continuation of the results, Table 5 presents the correlations among key health risk factors. Perceived stress was positively correlated with sleep problems ($r = 0.25$, $p < 0.01$), alcohol use ($r = 0.17$, $p < 0.05$), smoking ($r = 0.14$, $p < 0.05$), and drug use ($r = 0.19$, $p < 0.01$).

Alcohol consumption showed a strong correlation with smoking ($r = 0.43$, $p < 0.01$) and a moderate correlation with drug use ($r = 0.15$, $p < 0.05$).

Consumption of energy drinks was positively associated with fast food ($r = 0.40$, $p < 0.01$), carbonated beverages ($r = 0.60$, $p < 0.01$), and coffee ($r = 0.23$, $p < 0.01$). Fast food consumption was also correlated with carbonated drinks ($r = 0.30$, $p < 0.01$). Coffee was positively correlated with alcohol ($r = 0.20$, $p < 0.01$) and smoking ($r = 0.20$, $p < 0.01$).

These results indicate clustering of multiple health risk behaviors, suggesting that students engaging in one risk behavior are more likely to engage in others, highlighting potential targets for preventive interventions.

Overall, the correlation matrices demonstrate that health-promoting behaviors, including regular physical activity, breakfast consumption, and fruit intake, tend to cluster. In contrast, health risk behaviors, such as substance use, energy drink consumption, fast food intake, and elevated perceived stress, also co-occur. These patterns suggest that students with suboptimal lifestyle habits may be at increased risk for poor physical health, impaired cognitive performance, and greater susceptibility to injury.

## Logistic Regression Analysis: Health Assessment

Logistic regression identified lifestyle factors significantly associated with medical students' health. Positive predictors of optimal health included: eating at home during the week ($Exp(B) = 1.292$, $p = 0.031$), daily fruit consumption ($Exp(B) = 1.461$, $p = 0.014$), regular physical activity ($Exp(B) = 1.293$, $p = 0.004$), sleep hours per night ($Exp(B) = 1.918$, $p = 0.028$), and satisfaction with current weight ($Exp(B) = 1.067$, $p = 0.012$).

Negative predictors associated with suboptimal health were: consumption of sweets ($Exp(B) = 0.819$, $p = 0.005$), fast food ($Exp(B) = 0.545$, $p = 0.012$), sleep problems ($Exp(B) = 0.07$, $p = 0.033$), academic stress ($Exp(B) = 0.881$, $p = 0.022$), and insecurity about mental health ($Exp(B) = 0.977$, $p = 0.016$).

These results indicate that students with unhealthy lifestyle habits, such as frequent consumption of fast food or sweets, insufficient sleep, and high stress, may be at greater risk of reduced cognitive and physical performance, thereby increasing the likelihood of errors or injury. Conversely, adherence to healthier behaviors supports improved physical and mental functioning and may protect against performance deficits and injury.

## DISCUSSION

This study examined lifestyle patterns and health-related risk factors among medical students in Tirana, focusing on potential impacts on injury susceptibility and performance. Although the average BMI was within normal limits (22.63 ± 3.40 kg/m²), approximately one in four students were overweight or obese, and a smaller proportion were underweighted, indicating vulnerability to metabolic dysregulation, reduced physical capacity, and related health concerns (1,2).

Several unhealthy behaviors were prevalent and frequently co-occurred. Skipping breakfast (35.2%), low consumption of fruits (41.3%) and vegetables (37.1%), frequent intake of fast food, sweets, and energy drinks (85.9%), inadequate physical activity (24.9% exercised daily), and insufficient sleep were common. The clustering of these behaviors suggests a cumulative effect, increasing the risk of adverse health and functional outcomes (5,6). Students who engaged in regular physical activity also reported healthier dietary patterns, highlighting the synergistic benefits of multiple positive habits.

More than half of participants (57.7%) reported high academic stress, which was associated with disrupted sleep, unhealthy eating habits, and increased use of alcohol or other substances. Persistent stress impairs cognitive function and reduces physical performance, potentially increasing the risk of accidents or errors in academic and clinical settings (9,10).

In summary, the combination of suboptimal nutrition, low physical activity, inadequate sleep, and elevated stress may negatively affect neurocognitive performance and physical health. These factors, together, heighten the risk of injury and reduced academic performance, underscoring the need for integrated interventions that target lifestyle improvement, stress reduction, and overall health promotion among medical students.

### Limitations

This study has several limitations. The cross-sectional design precludes causal inferences. Data were self-reported and may be subject to recall or social desirability bias. Additionally, the study was limited to students at the Public University of Medicine in Tirana, excluding private institutions, which may restrict the generalizability of the findings to other medical student populations.

## CONCLUSIONS

Unhealthy lifestyle behaviors are prevalent among medical students in Tirana. Irregular meal patterns, poor dietary quality, low physical activity, and insufficient sleep may impair cognitive and physical performance and increase the risk of adverse health outcomes. Targeted interventions and the development of a supportive campus environment are recommended.

Campuses that promote healthy eating, physical activity, and stress management are recommended to support student well-being.

### Ethical Consideration

Review articles are exempted from an institutional review board (IRB)/Ethical approval.

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**Author Contributions:** F. M contributed to all aspects of the study, including conceptualization, methodology, analysis, and manuscript preparation. L. K contributed to the methodology of study. F. M contributed to the analysis, and manuscript preparation. Both authors contributed equally to the intellectual content, reviewed, and approved the final manuscript.

**Conflict of Interest:** The author declares no conflict of interest.

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