



eISSN: 2281-7824

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Healthc Low-resour S 2024 [Online ahead of print]

To cite this Article:

Jerliu N, Kamberi H, Mone I, et al. **Sociodemographic correlates of dietary habits among university students of health sciences in Kosovo.** *Healthc Low-resour S* doi: 10.4081/hls.2024.12898

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Sociodemographic correlates of dietary habits among university students of health sciences in Kosovo

Naim Jerliu,^{1,2} Haxhi Kamberi,^{3,4} Iris Mone,⁵ Drilon Zekaj,^{1,6} Pranvera Krasniqi,² Genc Burazeri^{5,7}

¹Faculty of Medicine, University of Prishtina “Hasan Prishtina”, Prishtina, Kosovo; ²National Institute of Public Health of Kosovo, Prishtina, Kosovo; ³Faculty of Medicine, University of Gjakova “Fehmi Agani”, Gjakova, Kosovo; ⁴Regional Hospital “Isa Grezda”, Gjakova, Kosovo; ⁵Faculty of Medicine, University of Medicine, Tirana, Albania; ⁶Clinical University Center of Kosovo, Prishtina, Kosovo; ⁷Department of International Health, CAPHRI (Care and Public Health Research Institute), Maastricht University, Maastricht, The Netherlands

Correspondence: Drilon Zekaj, Faculty of Medicine, University of Prishtina “Hasan Prishtina”, Str. Bulevardi i Dëshmorëve, 10 000 Prishtina, Kosovo.

E-mail: drilon.zekaj@uni-pr.edu

Key words: dietary habits, fruit, Kosovo, vegetables, university students.

Contributions: NJ, HK and GB contributed to the study conceptualization and design, analysis and interpretation of the data and writing of the article. IM, DZ and PK commented comprehensively on the manuscript. All the authors have read and approved the final version of the manuscript and agreed to be held accountable for all aspects of the work.

Conflict of interest: the authors declare no potential conflict of interest.

Funding: this study was supported by the National Institute of Public Health of Kosovo, and the Faculty of Medicine of the University of Gjakova.

Ethics approval and consent to participate: this study was approved by the Ethics Committee of the National Institute of Public Health of Kosovo (Decision: 01/1531, date: 28-12-2023) and by the Ethics Committee of the Faculty of Medicine, University of Gjakova (Decision: 006/82, date: 12-01-2024).

Informed consent: all students were informed about the aim and objectives of the study and were explained in sufficient detail particularly the aspects related to the anonymity of the survey and the successive aggregated analysis.

Availability of data and materials: the data presented in this study are available upon request from the corresponding author.

Acknowledgments: we thank the students of the universities of Gjakova and Prishtina (attending the branches of Nursing, Physiotherapy, Health Management, and Public Health) for their valuable participation in this survey.

Abstract

We aimed to assess the prevalence and sociodemographic correlates of selected dietary habits among students of health sciences in Kosovo. A cross-sectional study was conducted in Kosovo in 2024, including 470 students of health sciences ($\approx 86\%$ females; mean age: 20.7 ± 2.7 years;

response rate: 70%). Information on selected dietary habits and sociodemographic factors of the students was gathered. Independent positive correlates of a lower fruit intake (<1 time/day) included male gender (OR=2.3, 95% CI =1.3-4.2) and a lower economic level (OR=1.5, 95% CI =1.0-2.3). Furthermore, positive independent correlates of a higher frequency of consumption of fried foods (≥ 1 time/day) included male gender (OR=2.2, 95% CI =1.2-4.1), urban residence (OR=1.6, 95% CI =1.0-2.6) and a lower economic level (OR=1.7, 95% CI =1.0-2.7). Conversely, excessive salt intake was positively and strongly correlated to a lower economic level (OR=3.5, 95% CI =2.1-6.0), but inversely related to students' age (OR=0.4, 95% CI =0.2-0.9). Male gender and particularly a lower economic level were strong correlates of poor dietary habits among university students in Kosovo. Targeted interventions are needed to address dietary habits among youths, with a focus on providing support and resources to economically disadvantaged individuals.

Introduction

The association between dietary habits and the health of the populations worldwide has been the subject of rigorous research over many decades.¹ Currently, the increasing global prevalence of overweight and obesity is attributed to insufficient physical activity coupled with a continuous increase in unhealthy eating habits, which consists especially of consumption of energy-dense, high-fat, and sugary food.² These unhealthy behavioural patterns unavoidably lead to an increase in non-communicable diseases including cardiovascular diseases and diabetes.³ Other unhealthy eating behaviours, especially among young people, include also breakfast skipping, night eating, eating away from home, and emotional eating.⁴⁻⁶ In particular, eating away from home consists usually of energy-dense food leading to an increase in body

mass and obesity.^{4,7,8} Indeed, it has been shown that meals consumed in fast food restaurants, consisting of fried items and other energy-dense foods, increase significantly the risk of overweight and obesity.⁹ Such dietary habits related to the consumption of fast food are more common among young individuals including university students.

Based on the importance of healthy dietary habits, healthcare professionals including also university students of health sciences have an important role in promoting healthy nutrition in order to prevent diet-related risk factors, such as overweight and obesity, and their associated noncommunicable diseases.^{10,11} Additionally, current and future healthcare professionals must possess a comprehensive understanding of healthy and sustainable diets and align their actions with this knowledge and their attitudes, as they play a crucial role in disseminating this information to patients and the broader community.¹⁰ However, the translation of knowledge to effective and healthy practice is not always the case with students of health sciences who are said to lead a stressful life that is often at odds with maintaining good health.^{12,13} As a matter of fact, several studies have reported a high prevalence of consumption of fast food and soft drinks among students of health sciences,^{13,14} although they are assumed to have greater knowledge about junk food and its deleterious health effects.

Kosovo, the newest state in Europe, proclaimed its independence in 2008. Since, Kosovo has been experiencing deep and intensive socio-political and economic transformations,¹⁵ which are also accompanied by shifts in disease burden and lifestyle practices.¹⁵⁻¹⁷ Currently, Kosovo displays unfavourable health indicators compared with the other countries in the Western Balkans including the neighbouring Albania.¹⁸ In line with the experience and evidence in other low-and middle-income countries worldwide, the burden of non-communicable diseases has increased in Kosovo in the past few decades, including especially cardiovascular diseases.¹⁸ However, there is no specific information on the nutritional practices and dietary habits of current or future health professionals (students) in Kosovo.

In this framework, the aim of our study was to assess the prevalence and sociodemographic correlates of selected dietary habits among university students of health sciences in Kosovo. We hypothesised a higher prevalence of unhealthy dietary practices among male students and individuals pertinent to a lower socioeconomic status.

Materials and Methods

A cross-sectional study was carried out in Kosovo during the period February-April 2024.

All students of health sciences from the universities of Prishtina (the capital of Kosovo) and Gjakova (one of the main regions of Kosovo) were invited to participate (N=671). The invited students were attending the following branches of health sciences: nursing, physiotherapy, public health, and health management. Of all the invited students, 201 (about 30% of the total) did not complete the survey and/or provided partial responses. However, there were no significant demographic differences among respondents and non-respondents regarding gender and age distribution. The final sample included in the analyses included 470 students, of whom 405 (about 86%) were females and the remaining 65 (around 14%) were males. Considering both non-respondents and incomplete questionnaires, the final response rate in our study was: $470/671=70\%$.

The data collection included a structured and anonymous questionnaire which was self-administered by all students who agreed to participate in this study. The questionnaire consisted of an assessment of selected dietary habits and sociodemographic factors of students who participated in the study.

Assessment of dietary habits includes measurement of vegetable intake, fruit intake, consumption of sweets, consumption of fried foods, and salt intake.

Vegetable intake

Participants were asked to report on their usual consumption of fresh vegetables. Response categories were as follows: at least 1 time/day, at least 2-3 times/week, at least 1 time/week, at least 1-2 times/month, few times/year, and almost never. In the analysis, vegetable intake was dichotomized into: “ ≥ 1 time/day” vs “ < 1 time/day”.

Fruit intake

Participants were asked to report on their usual consumption of fresh fruit. Response categories were as follows: at least 1 time/day, at least 2-3 times/week, at least 1 time/week, at least 1-2 times/month, few times/year, and almost never. In the analysis, fruit intake was dichotomized into: “ ≥ 1 time/day” vs “ < 1 time/day”.

Consumption of sweets

Participants were asked to report on their usual consumption of sweets. Response categories were as follows: at least 1 time/day, at least 2-3 times/week, at least 1 time/week, at least 1-2 times/month, few times/year, and almost never. In the analysis, consumption of sweets was dichotomized into: “ ≥ 1 time/day” vs “ < 1 time/day”.

Consumption of fried foods

Participants were asked to report on their usual consumption of fried foods. Response categories were as follows: at least 1 time/day, at least 2-3 times/week, at least 1 time/week, at least 1-2 times/month, few times/year, and almost never. In the analysis, consumption of fried foods was dichotomized into: “ ≥ 1 time/day” vs “ < 1 time/day”.

Salt intake

Participants were asked to report on their usual salt intake. Response categories were as follows: a lot, some, a little, and almost none. In the analysis, salt intake was dichotomized into: “a lot” vs “≤some”.

Sociodemographic factors included gender (“males” vs “females”), age (categorized in the analysis into: 18-19, 20, 21, and ≥ 22 years), place of residence (“urban areas” vs “rural areas”), marital status (“single” vs “married”), current employment status (“yes” vs “no”), and economic level (dichotomized into: “good” vs “not good”) (Table 1).

The study was approved by the Ethics Committee of the National Institute of Public Health of Kosovo (Decision: 01/1531, date: 28-12-2023) and by the Ethics Committee of the Faculty of Medicine, University of Gjakova (Decision: 006/82, date: 12-01-2024). All students were informed about the aim and objectives of the study and were explained in sufficient detail particularly the aspects related to the anonymity of the survey and the successive aggregated analysis.

Binary logistic regression was used to assess the association of dietary habits with sociodemographic characteristics of the students (Table 2). Initially, crude (unadjusted) models were run (upper panel). Crude/unadjusted Odds Ratios (ORs) and their respective 95% Confidence Intervals (95% CIs) were calculated. Next, multivariable-adjusted models were run (lower panel), controlling simultaneously for all sociodemographic factors of the students (age, sex, place of residence, marital status, current employment status, and economic level). Multivariable-adjusted ORs and their respective 95% CIs were calculated. Hosmer-Lemeshow test was used to assess the goodness-of-fit of the multivariable-adjusted logistic regression models.¹⁹ As a rule of thumb for the Hosmer-Lemeshow test, p-values over 0.20 indicate that the multivariable-adjusted logistic regression models are suitable (*i.e.* the models fit well the

data).¹⁹ In our analyses, all multivariable-adjusted logistic regression models met the Hosmer-Lemeshow criterion.¹⁹

In all circumstances, a p-value of ≤ 0.05 was considered as statistically significant. Statistical Package for the Social Sciences (SPSS, version 19.0) was used for all the statistical analyses.

Results

Overall, about 25% of the students were 18-19 years old, and around 19% were ≥ 22 years; approximately 49% were from the University of Prishtina; about 77% were nursing students; around 42% were urban residents; about 5% were married; around 7% of the students were also employed, and almost 33% reported “not good” economic situation (data not shown).

The distribution of selected dietary habits by sociodemographic characteristics of the students is presented in Table 1. Overall, consumption of “ ≥ 1 times/day” was about 44% for fresh vegetables, 46% for fresh fruit, 31% for sweets, and 20% for fried foods. Furthermore, excessive salt intake was reported by about 16% of the students. Compared to females, male students exhibited a lower daily intake of fresh vegetables (about 45% vs 37%, respectively) and particularly fresh fruit (49% vs 31%, respectively), but a higher consumption of fried foods (around 19% vs 29%, respectively) and excessive salt intake (16% vs 22%). Older students (22 years and above) consumed less sweets, fried foods, and salt compared with their younger counterparts. Compared with rural residents, students from urban areas had a higher daily fruit intake (about 44% vs 49%, respectively), as well as a higher daily consumption of sweets (28% vs. 35%, respectively) and fried foods (17% vs. 25%, respectively). Compared with better-off individuals, students with a lower economic level reported a lower daily intake of fresh fruit (around 49% vs 40%, respectively), but a higher daily consumption of fried foods (17% vs 26%, respectively) and particularly a higher excessive salt intake (11% vs 28%, respectively) (Table 1).

In crude/unadjusted binary logistic regression models (Table 2), a lower intake of fresh fruit (<1 time/day) was positively related to male gender (OR=2.2, 95% CI =1.2-3.8) and a lower economic level (OR=1.5, 95% CI =1.0-2.2). Furthermore, higher consumption of fried foods (≥ 1 time/day) was positively associated with male gender (OR=1.8, 95% CI =1.0-3.2), urban residence (OR=1.6, 95% CI =1.0-2.5) and a lower economic level (OR=1.7, 95% CI =1.1-2.7). In addition, excessive salt intake was positively related to a lower economic level (OR=3.3, 95% CI =2.0-5.4).

In multivariable-adjusted logistic regression models (Table 2), independent correlates of a lower intake of fresh fruit included male gender (OR=2.3, 95% CI =1.3-4.2) and a lower economic level (OR=1.5, 95% CI =1.0-2.3). Furthermore, independent correlates of higher consumption of fried foods included male gender (OR=2.2, 95% CI =1.2-4.1), urban residence (OR=1.6, 95% CI =1.0-2.6), and a lower economic level (OR=1.7, 95% CI =1.0-2.7). Also, upon multivariable adjustment for all sociodemographic characteristics, excessive salt intake was positively related to a lower economic level (OR=3.5, 95% CI =2.1-6.0), but inversely associated with age (OR=0.4, 95% CI =0.2-0.9) (Table 2).

Discussion

The main findings of this study carried out in Kosovo include a high prevalence of unhealthy dietary habits among university students of health sciences. Hence, less than half of the participants reported a daily consumption of fresh vegetables and/or fresh fruit, whereas almost one in three students reported a daily consumption of sweets and one in five participants reported a daily consumption of fried foods. Also, almost one in six participants reported an excessive salt intake. The main independent correlates of poorer dietary habits consisted of male gender and especially a lower economic level of the students.

Our findings on a relatively higher prevalence of unhealthy dietary habits are compatible with several previous studies conducted among university students of health sciences.^{12-14,20-22} A recent study concluded that medical students did not reflect in their daily practice the seemingly satisfactory level of awareness regarding healthy dietary habits.¹³ However, a comparison in the same study¹³ between medical and non-medical students revealed a higher intake of vegetables among medical students (about 35%) compared with non-medical students (25%). In our study, vegetable consumption was higher than some previous reports which have generally documented a low intake of vegetables and fruit, but a high consumption of fast food among students of health sciences.^{13,14,20-22} On the other hand, the frequency of consumption of fried foods in our study was similar to the consumption of fast food reported in a previous study conducted in Saudi Arabia.¹³

A recent study including mostly students of health sciences and some health professionals reported that, overall, fruit and vegetables were consumed 1-2 or more times a day by about 68% and 63% of the participants, respectively,¹⁰ which is considerably higher compared with our study conducted in Kosovo. One possible explanation suggested by the authors regarding the reporting of a relatively high consumption of fruit and vegetables in their study was the considerable predominance of female respondents,¹⁰ who have been shown to be more concerned with their health compared to males.^{23,24} Hence, our finding on a positive association between male gender and unhealthy dietary habits is compatible with previous studies.²³⁻²⁵

In general, a significant positive correlation has been reported between higher fruit and vegetable consumption and a deeper knowledge and more favourable attitudes toward healthy dietary habits among university students of health sciences.¹⁰

All in all, however, students of health sciences have been shown to have suboptimal compliance with healthy dietary habits including night-eating habits, irregular meal times, and especially fast food consumption.²⁵

On another note, a previous study conducted in Kosovo in 2019 including a nationwide sample of about 2,700 adult individuals aged 18-69 years has reported that only about 12% of both men and women consumed five or more servings of fruits and vegetables daily, thereby meeting the minimum daily intake recommended by the World Health Organization.²⁶ Age differences aside, this is in line with our findings related to low daily consumption of fruit and vegetables among students. Furthermore, according to the aforementioned previous study conducted in Kosovo in 2019, almost one-third of the population “always or often” added salt or salty sauce to their food before or during eating, and 39% “always or often” added salt to food when cooking at home.²⁶ Also, around 40% of participants in that study “always or often” ate processed foods with a high salt content.²⁶ These findings are generally compatible with our results pertinent to university students of health sciences where excessive salt intake was reported by 16% of participants.

Our initial hypothesis on a positive link between unhealthy dietary habits and a lower economic level was confirmed and is in line with previous studies reported in the international literature.¹² In general, less wealthy students may exhibit more unhealthy dietary habits than their better-off peers due to a higher cost of healthy foods, limited access to healthy food choices, time constraints, or social and environmental influences imposed on them.

This study conducted in Kosovo may have some limitations inherently present in cross-sectional studies, which do not allow inferences regarding causal relationships. Also, the sample included in our study may not necessarily represent all students of Kosovo considering also the non-response of almost 30% of the targeted population. In addition, there is a possibility of information bias including recall bias, reporting bias, or cultural bias. Furthermore, although there is no plausible reason to assume variations in self-reporting of dietary habits, we cannot rule out entirely the possibility of differential reporting between

different sociodemographic groupings of study participants (distinguished by age, gender, place of residence, or other sociodemographic characteristics).

Conclusions

Nonetheless, despite the possibility of these potential limitations, our study provides useful evidence on the prevalence and sociodemographic correlates of selected dietary habits among students of health sciences in Kosovo, the newest state in Europe that has been undergoing profound changes in the past decades, affecting unavoidably also the nutritional practices and dietary habits of the general population.

In conclusion, our study conducted in Kosovo indicates that male gender and particularly a lower economic level are strong correlates of poorer dietary habits among university students. Targeted interventions are needed to address dietary habits among youths, with a focus on providing support and resources to economically disadvantaged individuals to promote healthier eating behaviours.

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Table 1. Distribution of dietary habits by sociodemographic characteristics in a sample of university students of health sciences from Kosovo in 2024 (N=470).

Sociodemographic characteristics	Dietary habits				
	Vegetable intake	Fruit intake (≥1 time/day)	Sweets	Fried foods (≥1 time/day)	Salt intake
	(≥1 time/day)		(≥1 time/day)		(a lot)
	N (%) [*]	N (%)	N (%)	N (%)	N (%)
Total sample (N=470)	208 (44.3)	218 (46.4)	146 (31.1)	95 (20.2)	77 (16.4)
Gender					
Male (n=65)	24 (36.9)	20 (30.8)	19 (29.2)	19 (29.2)	14 (21.5)
Female (n=405)	184 (45.4)	198 (48.9)	127 (31.4)	76 (18.8)	63 (15.6)
Age					
18-19 years (n=118)	55 (46.6)	47 (39.8)	37 (31.4)	23 (19.5)	25 (21.2)
20 years (n=149)	73 (49.0)	77 (51.7)	48 (32.2)	31 (20.8)	24 (16.1)
21 years (n=115)	45 (39.1)	52 (45.2)	37 (32.2)	28 (24.3)	18 (15.7)
≥22 years (n=88)	35 (39.8)	42 (47.7)	24 (27.3)	13 (14.8)	10 (11.4)
Residence					

Urban areas (n=198)	88 (44.4)	98 (49.5)	69 (34.8)	49 (24.7)	33 (16.7)
Rural areas (n=272)	120 (44.1)	120 (44.1)	77 (28.3)	46 (16.9)	44 (16.2)
Marital status					
Single (n=446)	199 (44.6)	208 (46.6)	142 (31.8)	92 (20.6)	72 (16.1)
Married (n=24)	9 (37.5)	10 (41.7)	4 (16.7)	3 (12.5)	5 (20.8)
Employment					
Not employed (n=439)	199 (45.3)	204 (46.5)	136 (31.0)	91 (20.7)	71 (16.2)
Students employed (n=31)	9 (29.0)	14 (45.2)	10 (32.3)	4 (12.9)	6 (19.4)
Economic level					
Good (n=317)	145 (45.7)	157 (49.5)	99 (31.2)	55 (17.4)	34 (10.7)
Not good (n=153)	63 (41.2)	61 (39.9)	47 (30.7)	40 (26.1)	43 (28.1)

* Absolute numbers and their respective percentages (in parentheses)

Table 2. Association of dietary habits with sociodemographic characteristics of the students; results from binary logistic regression models.

Upper panel: crude/unadjusted models						
Dietary habits	Sociodemographic characteristics					
	Male	Age ≥22	Urban areas	Single	Not employed	Less wealthy
Vegetable intake (<1 time/day)	1.4 (0.8-2.4)*	1.3 (0.8-2.3)	0.9 (0.7-1.4)	0.7 (0.3-1.7)	0.5 (0.2-1.1)	1.2 (0.8-1.8)
Fruit intake (<1 time/day)	2.2 (1.2-3.8)	0.7 (0.4-1.3)	0.8 (0.6-1.2)	0.8 (0.4-1.9)	0.9 (0.5-2.0)	1.5 (1.0-2.2)
Sweets (≥1 time/day)	0.9 (0.5-1.6)	0.8 (0.4-1.5)	1.4 (0.9-2.0)	2.3 (0.8-7.0)	0.9 (0.4-2.1)	1.0 (0.6-1.5)
Fried foods	1.8 (1.0-3.2)	0.7 (0.3-1.5)	1.6 (1.0-2.5)	1.8 (0.5-6.2)	1.8 (0.6-5.2)	1.7 (1.1-2.7)

(≥1 time/day)						
Salt intake (a lot)	1.5 (0.8-2.9)	0.5 (0.2-1.1)	1.0 (0.6-1.7)	0.7 (0.3-2.0)	0.8 (0.3-2.0)	3.3 (2.0-5.4)
Lower panel: multivariable-adjusted models						
Dietary habits	Sociodemographic characteristics					
	Male	Age ≥22	Urban areas	Single	Not employed	Less wealthy
Vegetable intake (<1 time/day)	1.3 (0.8-2.3)*	1.2 (0.7-2.2)	0.9 (0.6-1.4)	1.1 (0.4-2.9)	0.5 (0.2-1.3)	1.2 (0.8-1.7)
Fruit intake (<1 time/day)	2.3 (1.3-4.2)	0.7 (0.4-1.2)	0.8 (0.5-1.1)	0.9 (0.4-2.6)	1.1 (0.5-2.3)	1.5 (1.0-2.3)
Sweets (≥1 time/day)	1.0 (0.6-1.9)	0.9 (0.5-1.7)	1.4 (0.9-2.1)	2.6 (0.8-8.6)	0.7 (0.3-1.7)	0.9 (0.6-1.5)
Fried foods (≥1 time/day)	2.2 (1.2-4.1)	0.7 (0.3-1.6)	1.6 (1.0-2.6)	2.1 (0.5-8.1)	1.6 (0.5-5.1)	1.7 (1.0-2.7)
Salt intake (a lot)	1.7 (0.8-3.4)	0.4 (0.2-0.9)	0.9 (0.6-1.6)	0.7 (0.2-2.3)	0.8 (0.3-2.2)	3.5 (2.1-6.0)

*Odds Ratios and their respective 95% Confidence Intervals (in parentheses) from binary logistic regression models

Submitted: 4 August 2024

Accepted: 12 September 2024

Early access: 26 September 2024