

## EVALUATION OF NUTRITIONAL STATUS AND ADHERENCE TO A HEALTHY DIET AMONG THE ROMANIAN POPULATION

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### Abstract

With a cross-sectional observational study based on a questionnaire, the adherence of the Romanian population to a balanced diet and a healthy lifestyle was evaluated, as well as nutritional imbalances in correlation with the health status of the respondents. A total number of 2352 valid answers was registered from 66.7% female respondents and 33.3% male respondents. Regarding the respondents' adherence to a healthy diet correlated with a balanced lifestyle, it was found that only 4.3% of the respondents adopt a balanced diet. Most of the respondents who belong to the group of those with a healthy diet are people between 40 and 50 years old and female (63% of the people are women). Moreover, most of the male respondents are overweight (43.7%). The majority of respondents from all BMI groups declared that they used to eat 1 - 2 meals/day in a chaotic manner. Approximately 50% of the people in the unhealthy diet group are represented by young people up to 30 years old, while approximately 45% of the people in the healthy diet group are middle-aged people, up to 50 years old. Identifying unhealthy eating habits such as low consumption of vegetables and fruits, low consumption of fish and seafood, insufficient hydration, as well as life-style problems such as the tendency to be sedentary, spending a long time in front of the tablet, computer or the telephone, the chaotic schedule of meals, the lack of a periodic evaluation of the state of health, in a large percentage of the respondents, raises an alarm signal and also imposes the need for corrective measures through the involvement of the authorities.

### Rezumat

Cu un studiu observațional transversal bazat pe chestionar, a fost evaluată aderența populației românești la o alimentație echilibrată și un stil de viață sănătos, precum și dezechilibrele nutriționale în corelație cu starea de sănătate a respondenților. A fost înregistrat un număr total de 2352 de răspunsuri valide de la 66,7% respondenți de sex feminin și 33,3% respondenți de sex masculin. În ceea ce privește aderarea respondenților la o alimentație sănătoasă corelată cu un stil de viață echilibrat, s-a constatat că doar 4,3% dintre respondenți adoptă o dietă echilibrată. Majoritatea respondenților care aparțin grupului celor cu o alimentație sănătoasă sunt persoane între 40 și 50 de ani și femei (63% dintre persoane sunt femei). Mai mult, majoritatea respondenților de sex masculin sunt supraponderali (43,7%). Majoritatea respondenților din toate grupele de IMC au declarat că obișnuiau să mănânce 1 - 2 mese/zi într-o manieră haotică. Aproximativ 50% dintre persoanele din grupa alimentației nesănătoase sunt reprezentate de tineri până la 30 de ani, în timp ce aproximativ 45% dintre persoanele din grupa alimentației sănătoase sunt persoane de vârstă mijlocie, până la 50 de ani. Identificarea unor obiceiuri alimentare nesănătoase în rândul respondenților, cum ar fi consumul redus de legume și fructe, consumul redus de pește și fructe de mare, hidratarea insuficientă, precum și probleme de stil de viață precum tendința de a fi sedentar, petrecerea mult timp în fața tabletei, computerului sau telefonului, orarul haotic al meselor, lipsa unei evaluări periodice a stării de sănătate, la un procent mare dintre respondenți, dă un semnal de alarmă și, de asemenea, impune necesitatea unor măsuri corective prin implicarea autorităților.

**Keywords:** healthy diet, balanced lifestyle, eating habits, nutrients, adherence to a healthy diet, public health

### Introduction

Cardio-metabolic diseases (obesity, cardiovascular diseases, type 2 diabetes, gout), liver diseases, various

types of cancer are the main causes of mortality and disability worldwide. Genetic and environmental factors have an impact in increasing the risk of these diseases,

but dietary behaviour and lifestyle are the determining factors involved in the occurrence of the non-communicable diseases listed above [1-3].

Correct and healthy nutrition suppose the careful selection of food and all ingredients, their correct handling before preparing them, a correct intervention on them in the process of preparing dishes, so that the nutrients retain their properties and manifest in the body the beneficial effects for which we consume them [4, 5].

Healthy lifestyle habits in middle age (i.e. a balanced diet or, why not, even a slight reduction in caloric intake), are associated with a “healthy” aging process, characterized by: low risk or even absence of severe chronic diseases, reducing the decline of cognitive functions, mental health, maintaining the health and efficiency of the immune system, preserving mitochondrial activity and reducing oxidative stress. Clinical studies have shown that the Mediterranean diet is the ideal food model for maintaining health through the daily intake of valuable nutrients and antioxidants, but they have also highlighted the role of these nutrients in preventing various imbalances. The Mediterranean diet and all recommendations related to healthy eating are based on the daily consumption of vegetables, fruits, whole grains, aromatic herbs, consumption of olive oil or vegetable oils (especially extra virgin), consumption of fish, seafood, dairy products and especially the acidic ones, foods that provide the body with vitamins, minerals, antioxidants, fibres, probiotics particularly important for health. Also, saturated fats, refined carbohydrates, alcohol are limited in consumption in the case of healthy diets [6-9].

A healthy lifestyle also involves avoiding the consumption of toxic substances (drugs, tobacco) as well as avoiding alcohol abuse [10, 11]. And environmental factors, especially pollution, represent another risk factor for health. The quality of food is also reflected in the absence of organic and inorganic pollutants from both vegetable, animal and marine products [12-15]. When the level of contaminants exceeds the maximum limits allowed by the legislation on food quality, the life of the consumer is put in danger [16].

Along with feeding, proper hydration of the body is important for a good assimilation of nutrients, an optimal digestion but also for an efficient detoxification of it. Effective hydration also helps the optimal functioning of the nerve cell and implicitly cognitive processes [17-20].

Physical activity is very important both for the consumption of excess calories from food and especially for the beneficial effects on the circulatory and lymphatic systems, but also on the emotional state. Physical activity helps to develop the muscles, toning the body, detoxification and the functionality of the joints. Sedentarism is a risk factor for obesity with negative long-term health consequences [21-24].

According to the recommendations in the guides, a physical activity of at least 60 minutes daily is recommended for children and 30 minutes daily for adults [25].

Rest is very important for restoring the body. Lack of sleep can have both short-term and long-term consequences. Insufficient sleep affects everything from interpersonal relationships to work productivity to memory function. The negative impact sleep has on chronic disease and weight gain may be partially explained by the connection between sleep and hormone regulation. During sleep, the body produces hormones to help control appetite, energy metabolism and glucose processing. Poor sleep is linked to increased insulin production after meals, decreased leptin levels, and increased ghrelin levels. These three hormones perform the functions of regulating glucose, promoting fat storage, alerting the brain that it has enough food, and stimulating appetite. Overproduction and underproduction of these hormones is detrimental to health and weight control [26-28].

For the analysis of the eating habits and lifestyle of the population in Romania, a questionnaire was developed that sought to study some correlations between food and behavioural factors and the state of health in the context of the respondents' adherence to a healthy lifestyle and balanced diet. In addition, the study analysed a series of aspects of the psycho-emotional component influenced mainly by the lifestyle but also by the quality of the diet: the frequency of states of fatigue correlated with the duration of sleep and the type of activity carried out daily but also with meal schedule, frequency of nervousness, depressive, anxious states correlated with lifestyle, relaxation methods, communication with those around you, involvement in social activities, the existence of tensions in the family or entourage, the existence of financial problems. It was also monitored whether the psycho-emotional state determines a lack of appetite or an increase in appetite on an emotional basis among the study participants.

## Materials and Methods

### *Study Design*

The evaluation of the eating habits and lifestyle of the Romanian population was carried out through a cross-sectional observational study based on a questionnaire that was disseminated online using the Google Forms web platform between May 15 and June 15, 2022. The questionnaire composed of 34 items was distributed through institutional mailing lists of students and professional organizations in Romania as well as social networks, the only restriction imposed was age (over 18) and participation in the questionnaire was voluntary. Also, the participants were assured of the confidentiality regarding the sensitive personal data of the research according to

the GDPR (General Data Protection Regulation) compliance in order to be able to use and to publish the results.

#### *Questionnaire validation*

The questionnaire was first tested in the pilot phase on a group of 140 respondents over 18 years of age. For the validation and optimization of the questionnaire, a group of 4 experts was called upon to analyse the answers recorded in the pilot phase [29]. For the present questionnaire, the value of Cronbach's  $\alpha$  was 0.80, what it indicates is a good internal consistency and that the scale is reliable [30,31].

#### *Statistical analysis*

We expressed all the categorical variables both by absolute frequencies (n) and by relative frequencies (%). We transformed the continuous age variable into a variable with 4 categories (young individuals up to 30 years old, early adults between 30 and 50, middle age adults between 50 and 65 and seniors over 65 years old. Also, we transformed the Body mass index value into categorical variables with 4 categories (underweight, normal weight, overweight and obese).

The data were completed with a new categorical variable named "Adherence to a healthy diet", which was constructed based on the answers to questions 9 - 24, 27 - 28, 36 and 38, all questions having answers from 1 (very little or not at all) up to 5 (a lot or always). Summing up the answers formed a raw score, then we scaled into a T score (standardized) with an average of 50 and standard deviation of 10. Scores above 66 indicated maximum values for adherence to a healthy diet and those below 33 indicated an adherence to an unhealthy diet. We applied Pearson's Chi-square test or Fischer's exact test to analyse the existence of an association between different variables such as Gender, Body mass index groups and Adherence to a healthy diet or in relation with the rest of the variables involved in the study. All statistical analysis and graphic representations were performed in the open source software R (R version 4.1.3) [32,33] and we chose a significance level of 0.05.

Finally, we analysed the association between the outcome variable "Adherence to a healthy diet" and the predictor variables such as Gender, Age groups and BMI groups by applying logistic regression for a multinomial model and the results were expressed by relative risk ratios (RR), standard errors and the associated p values (only the significant ones) [34, 35]. The reference groups for the variables involved in the regression analysis are: 1. moderate healthy diet, for the dependent variable Adherence; 2. female, for gender; 3. normal weight, for BMI groups; 4. young adults from the age group (18 - 30), for the age groups. The results of the likelihood ratio tests given by the chi-square values and the p values demonstrated that all the chosen predictors have a significant effect in the chosen model:  $\chi^2 = 24.933$ ,  $p = 0.0003514$ , Gender:  $\chi^2 = 12.903$ ,  $p = 0.001578$ , BMI\_group:  $\chi^2 = 20.258$ ,  $p = 0.002491$ .

The regression analysis confirms the hypothesis that getting older is an important factor in choosing a healthier diet and that men and also people with a high BMI have a 2 to 3 times higher risk for choosing an unhealthy diet in relation to adherence to a moderate diet.

## **Results and Discussion**

### *Socio-demographic data*

The study carried out based on the dissemination of the questionnaire registered a total number of 2352 valid answers that came from 66.7% female respondents and 33.3% male respondents. The anthropometric data (weight and height) were used to calculate BMI (body mass (kg)/height (m<sup>2</sup>)) [36, 37]. After processing the anthropometric data, it was observed that most of the respondents are of normal weight (1143) and come from among women in particular (862), while the male respondents are predominantly overweight, that is 43.75% (343) of them. The socio-demographic characteristics of the respondents are presented in Table I.

**Table I**

Socio-demographic characteristics of respondents (n = 2352)

Characteristics	n	%
<b>Gender</b>		
Male	784	33.3
Female	1568	66.7
<b>Marital status</b>		
Single	844	35.9
Divorced/separated	153	6.5
Married	1355	57.6
<b>Age (years)</b>		
18 - 30	878	37.3
31 - 50	1085	46.1
50 - 65	328	13.9
> 65	61	2.7

Characteristics	n	%
<b>Residence areas</b>		
Urban areas	1824	77.6
Rural areas	528	22.4
<b>Level of education</b>		
General/primary studies	149	6.3
Secondary education (baccalaureate degree)	545	23.2
Post-secondary studies	210	8.9
Higher education (bachelor's degree)	808	34.4
Postgraduate studies (master's degree, residency, doctorate, other specializations)	640	27.2
<b>Employment status</b>		
Unemployed	39	1.7
Socially assisted	13	0.6
Householder	156	6.6
Retired	135	5.7
Student	419	17.8
Teleworking	137	5.8
I go to work every day	1203	51.1
I work in a mixed regime (telework and commuting)	250	10.6
<b>Body mass index (BMI)</b>		
Normal limits (18.5-24.9)	1143	48.6
Overweight category (25-29.9)	703	29.9
Underweight category (< 18.5)	387	16.4
Obese (≥ 30)	123	5.1

As can be seen from the data presented in Table I, the majority of participants in the conducted study are people aged between 31 and 50 years old, from the urban environment, active people who commute daily to work, people with family life and higher education.

*Adherence to a healthy diet*

To calculate the respondents' adherence to a healthy diet, the principles of a healthy and balanced diet were first of all taken into account, otherwise explained in the introductory part: the consumption of foods with increased nutritional value in compliance with the provisions of the nutrition guidelines related to the frequency of consumption and quantity. An unbalanced diet accompanied by unhealthy habits was included in the unhealthy diet category with the lowest score, a balanced diet accompanied by healthy habits was included in the healthy diet category and

received the highest score, and in the middle category, a moderately healthy diet was placed. As can be seen from Table II, the majority of respondents placed themselves in the moderately healthy diet group. The percentage of those who fall into the healthy diet group is the lowest, it should be noted that there are predominantly males in the group of those who fall into the unhealthy diet category, while in the group of those who fall into the healthy diet there are predominantly females.

**Table II**

Adherence to a healthy diet (n = 2352)

Variables	n	%
Healthy diet	101	4.3
Moderately healthy diet	2116	90
Unhealthy diet	135	5.7

**Table III**

Multinomial logistic regression expressed by risk ratio and standard error

	Dependent variable	
	Healthy Diet (1)	Unhealthy Diet (2)
Age Group 31 - 50	1.000 (0.000)	0.000*** (0.000)
Age Group 51 - 65	1.000 (0.000)	0.000*** (0.000)
Age Group > 65	3.000** (0.000)	0.000* (1.000)
Gender Male	1.000 (0.000)	2.000*** (0.000)
BMI Group 1 Underweight	1.000 (1.000)	2.000 (0.000)
BMI Group 3 Overweight	1.000* (0.000)	2.000*** (0.000)
BMI Group 4 Obese	1.000 (0.000)	3.000*** (0.000)
Constant	0.000*** (0.000)	0.000*** (0.000)
Akaike Inf. Crit.	1,832.000	1,832.000

Note: \*p < 0.1; \*\*p < 0.05; \*\*\*p < 0.01

From data presented in Table III it can be seen that the results obtained by logistic regression analyses

indicate a higher adherence to a healthy diet for older age groups compared to younger respondents (older

age groups had higher RR values for a healthy diet compared to younger age groups, but they were not statistically significant). At the same time, the logistic regression model confirms a lower adherence of male respondents to a healthy diet compared to female respondents, and also for obese group compared to underweight and overweight group.

The processing of the data collected from the respondents highlighted the weakest adherence to the healthy diet for young people up to 30 years old compared to the elderly (Table IV). Approximately 50% of the people in the unhealthy diet group are represented by young people up to 30 years old, while approximately 45% of the people in the healthy diet group are middle-aged people, up to 50 years old. Regarding the distribution of diet groups according to gender, 68% of the female people are in the moderately healthy diet group, 63% of the people in the healthy diet group are female. Related to the unhealthy diet group, 8.4% of male respondents fall into this group and only 4.4% of female respondents fall into this group. As a result, we observe that the majority of men are overweight or obese, a consequence of their low adherence to a healthy diet. The majority of normal weight group fell into the moderately healthy diet group (91% of them), while in the unhealthy diet group we meet more under or overweight and obese group. In the group of people with a healthy diet, 57% are normal weight people. Respondents with low adherence to a healthy diet reported a reduced consumption of vegetables and

fruits, an increased consumption of sweet products and saturated fats. The reduced consumption of vegetables and fruits deprives the body of a series of particularly valuable phytonutrients for health and the prevention of nutritional imbalances (antioxidants, vitamins, minerals, fibres) [38-43].

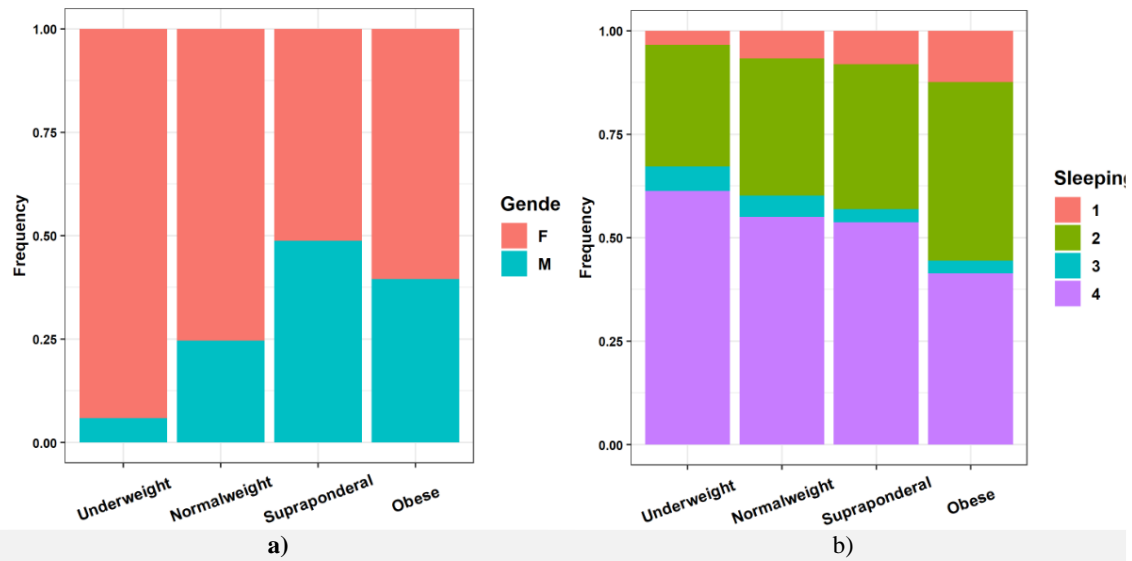
The distribution of BMI by gender (Figure 1a) highlights a higher percentage of female respondents in the group of underweight (94.1%) and normal weight (75.1%) people ( $p < 0.001$ ). The male respondents are distributed as follows: 343 (43.7%) in the overweight group, 281 (35.8%) in the normal weight group, 153 (19.5%) in the obese group and 7 (1%) in the underweight group. The following coding was used to analyse sleep duration: 1 – frequent insomnia; 2 – less than hours *per* night; 3 – over 9 hours *per* night; 4 – 7 - 9 hours *per* night (Figure 1b). According to the answers received, a more pronounced tendency towards insomnia was found in the case of obese respondents (12% of them) compared to the other categories and especially to the underweight ones (3% of them). Also, in the category of obese respondents (43% of them), the highest tendency to sleep less than 7 hours *per* night was found compared to the other categories and especially to underweight respondents (29% of them). The highest tendency to sleep 7 - 9 hours *per* night was noted in underweight group (61% of them) compared to the other categories and especially to obese group (only 41% of them) ( $p < 0.001$ ).

**Table IV**

Adherence to a healthy diet of age-group, gender and BMI group

Variable	Unhealthy	Diet	Moderate	Healthy diet	Healthy	Diet	p value
<b>Age</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	
[18, 30]	68	50	775	37	35	35	
[31, 50]	49	36	991	47	45	45	0.003993
[51, 65]	17	13	297	14	14	14	
> 65	1	1	53	3	7	7	
<b>Gender</b>							
F	69	51	1435	68	64	63	0.0002673
M	66	49	681	32	37	37	
<b>BMI</b>							
Underweight	9	7	106	5	4	4	
Normal weight	45	33	1040	49	58	57	0.01004
Supraponderal	49	36	629	30	25	25	
Obese	32	24	341	16	14	14	

POST HOC comparisons	
1. Underweight : Normal weight	0.0675
2. Underweight : Supraponderal	0.806
3. Underweight : Obese	0.899
4. Normal weight : Supraponderal	0.00216
5. Normal weight : Obese	0.00161
6. Supraponderal : Obese	0.553

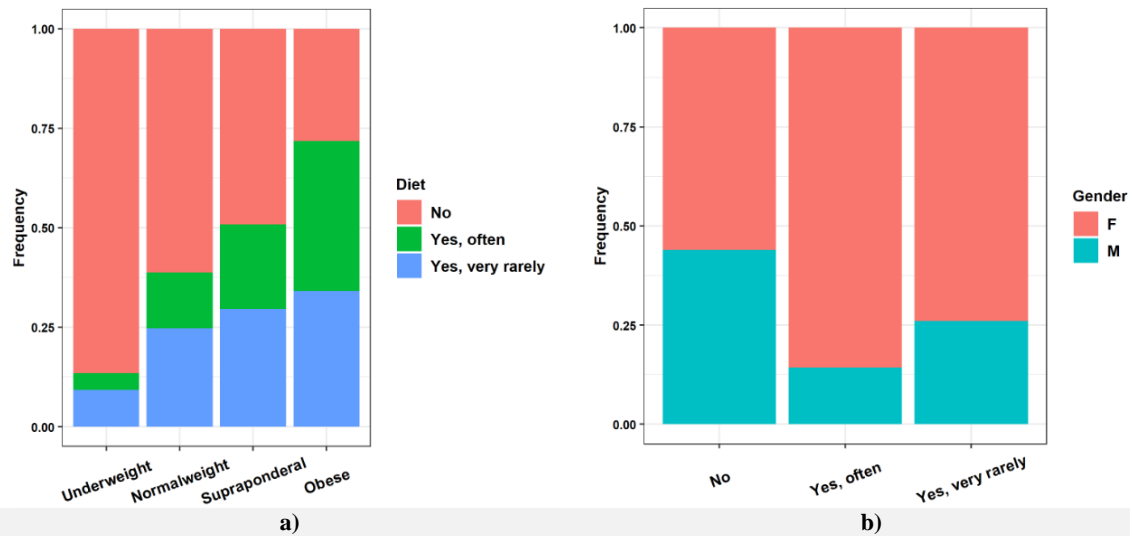


**Figure 1.**  
Distribution of BMI by a) gender, b) sleep duration

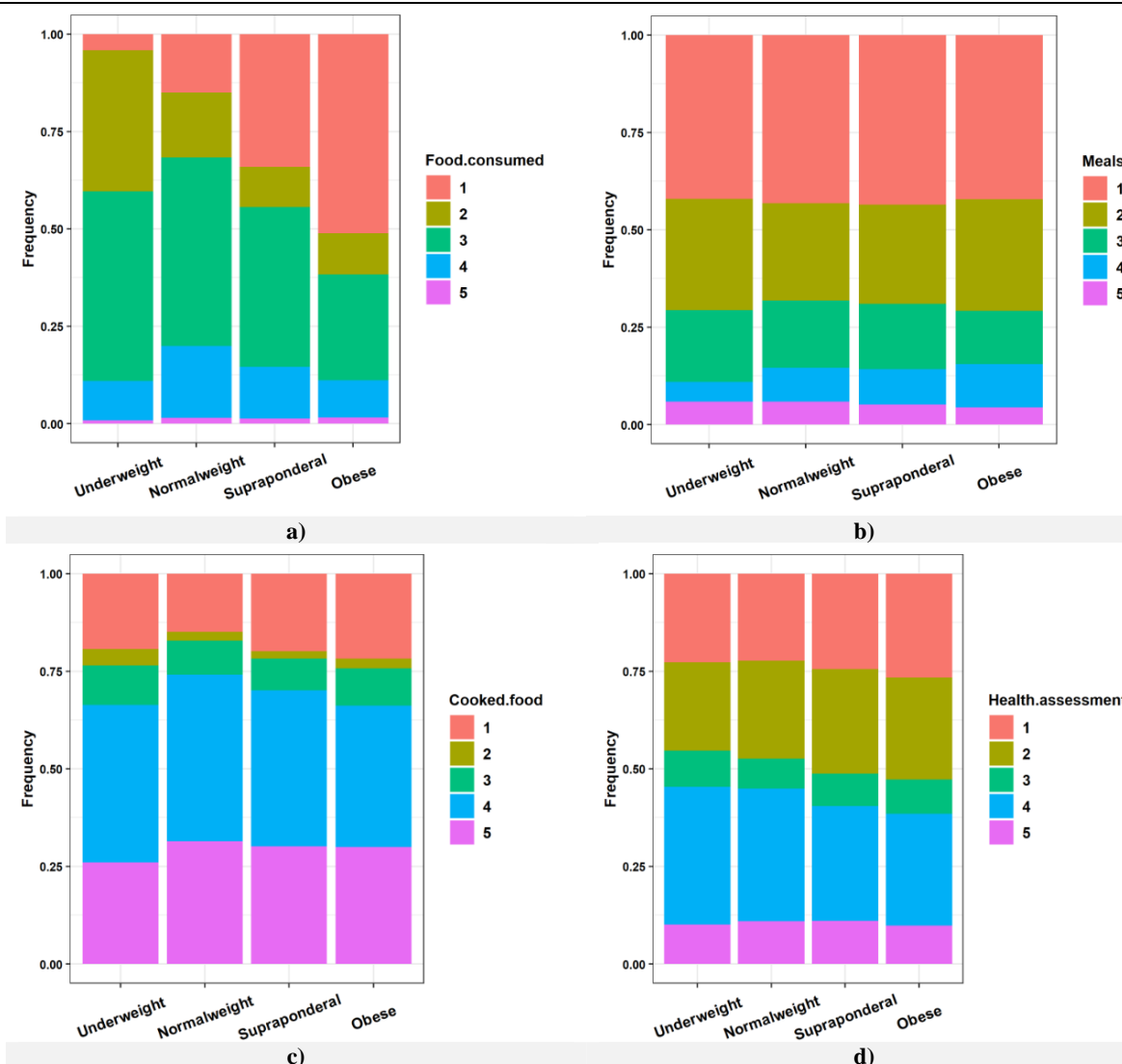
*Eating habits and lifestyle*

Regarding the use of a restrictive diet to reduce body weight, 53.5% of the respondents declared that they never resorted to such a regime, 26.9% declared that they sometimes resorted to it, while 19.6% have stated that they used frequently a restrictive diet. Surprisingly, among those who declared that they resorted to the restrictive diet, there are also underweight people, which indicates that either the restrictive diets were too drastic and produced a series of disorders in the body, or the respective people are not aware of the fact that they are below the limit of normality in terms of body weight. About 21% of overweight and 38% of obese respondents resorted to restrictive

diets most often, while only 14% of normal weight respondents declared that they often resorted to restrictive diets (Figure 2a). The respondents who declared that they have never resorted to a restrictive diet are approximately 87% of underweight people, 61% of normal weight people, 49% of overweight people and 28% of obese people ( $p < 0.001$ ). In general, the female respondents declared that they often resorted to restrictive diets (25% of them) and only 8% of the male respondents (Figure 2b). In fact, 71% of the male respondents declared that they never resorted to a restrictive diet to reduce body weight ( $p < 0.001$ ).



**Figure 2.**  
Application of a restrictive diet by a) BMI, b) sex



**Figure 3.**

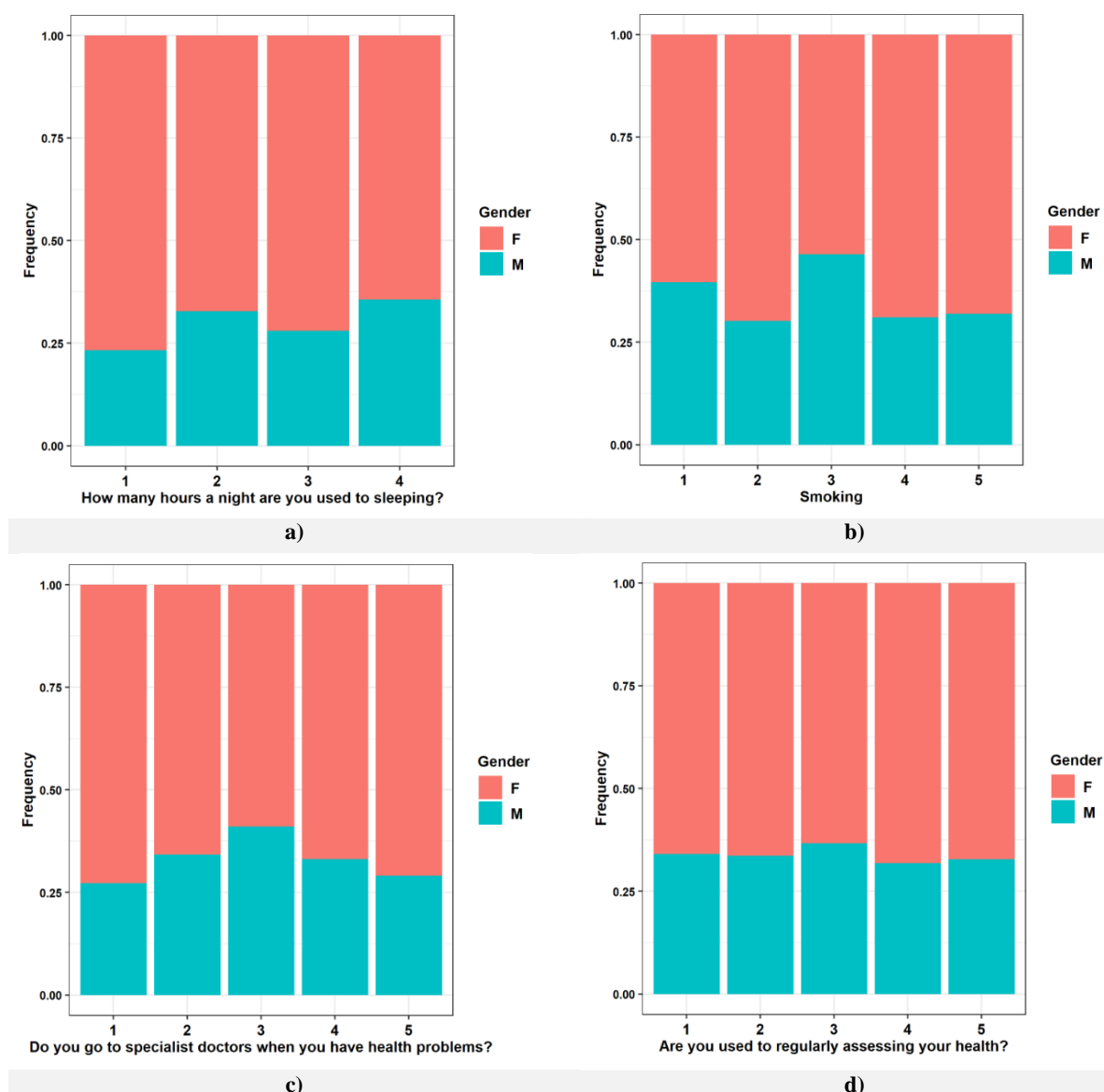
The distribution by BMI groups of a) the amount of food consumed, b) meals during the day, c) the category of cooked food products consumed frequently, d) type of food products that predominates in the daily diet

To analyse the amount of food consumed daily, the following codes were used: 1 – excessive food consumption; 2 – insufficient food consumption; 3 – weighted food consumption; 4 – weighted food consumption by monitoring body weight; 5 – food consumption according to the ration established by the nutritionist (Figure 3a). According to the answers received, 34% of overweight respondents and 51% of obese respondents declared that they consume food excessively ( $p < 0.001$ ). Only 36% of underweight respondents declared that they consume insufficient food, which proves that a good part of the respondents not realize that they do not consume food according to the body's needs because the other underweights did not declare that they have a deficient food intake, but it exists since the body does not have a normal weight. Very few respondents monitor their body weight (15.1% of them) and also extremely few respondents declared that they consume food according

to the ratio established by a nutritionist (1 - 2% of each BMI group). In the case of the analysis of the distribution of meals during a day, the following coding was applied: 1 – for 1 - 2 meals/day without a fixed schedule; 2 – for 3 meals/day without a fixed schedule; 3 – for 3 meals/day and 1 - 2 snacks without a fixed schedule; 4 – for 3 meals/day according to a fixed schedule; 5 – for 3 meals/day and 1 - 2 snacks according to a fixed schedule (Figure 3b). The majority of respondents from all BMI groups declared that they used to eat 1 - 2 meals/day in a chaotic manner (42 - 44% of each group). Between 25 and 29% of respondents from each BMI group are used to eating 3 meals a day without following a certain schedule and only a small percentage, between 5 and 11% of each BMI group are used to eating meals according to a rigorous schedule ( $p = 0.6167$ ). For the analysis of the categories of cooked food products consumed frequently, the following coding was used: 1 – fried

foods; 2 – food prepared on the grill with wood or charcoal; 3 – grilled food; 4 – food prepared in the oven; 5 – boiled, steamed or unheated food (Figure 3c). According to the answers received, 17.7% of the respondents are used to frequently consuming fried foods, and most of them are overweight and obese. The most consumed type of cooked food is the one prepared in the oven (40.6% of the respondents), especially normal-weight people (43% of them), while only 36% of obese people declared that they usually consume this type of cooked food ( $p = 0.1$ ). The analysis of the nutritional quality of the food products that predominate in the daily diet used the following coding: 1 – food products rich in fats; 2 –

sweets and pastry products; 3 – meat, fish and seafood dishes; 4 – dairy products; 5 – cereals, pasta, vegetables and fruits (Figure 3d). From the processed data, it was found that the daily diet of overweight and obese respondents is dominated by foods rich in fats (24% of overweight and 27% of obese), sweets and pastries (27% of overweight and 26% of obese), while that dairy products predominate in the daily diet of underweight and normal-weight respondents (35% of underweight and 34% of normal-weight). In all BMI groups, there is a reduced tendency in the daily consumption of fish and seafood (only 9.9% of the respondents prefer this food group) ( $p = 0.6552$ ).



**Figure 4.**

The distribution by gender of a) sleep duration, b) habit of smoking, c) tendency to consult a specialist on health problems, d) tendency to periodic evaluation of the state of health

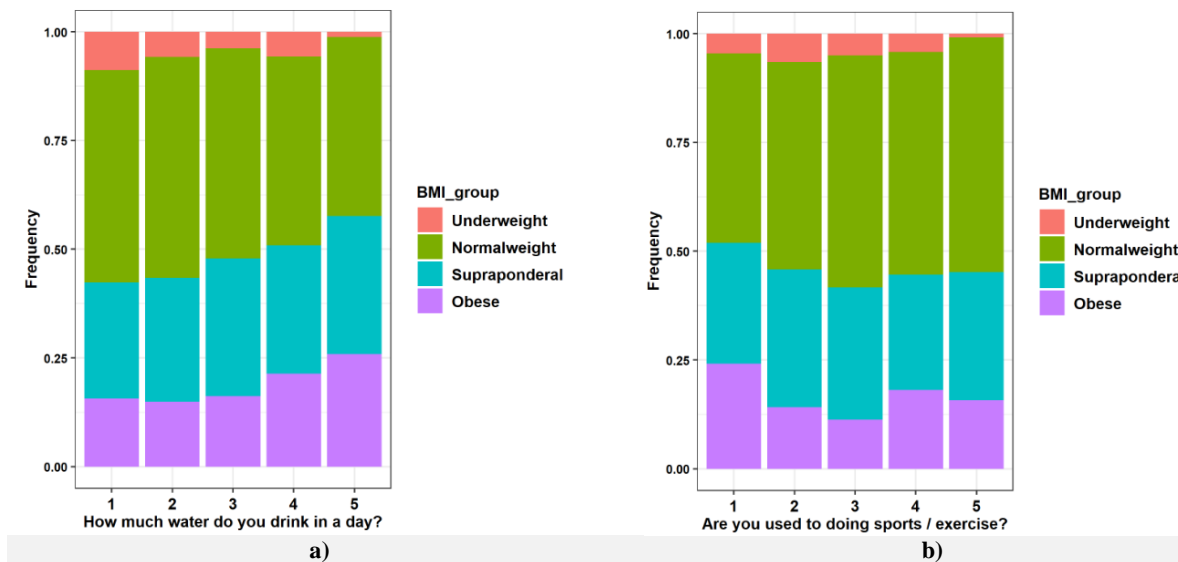
The evaluation of the tendency to consult specialized medical personnel when the state of health deteriorates

was made using the following coding: 1 – never; 2 – only in very serious cases; 3 – only if self-medication



does not give results; 4 – only when the state of health deteriorates more; 5 – every time health problems occur (Figure 4c). According to the answers received, it was found that female respondents are more likely to consult a specialist whenever their health deteriorates (29% of these) compared to men (24% of them), while male respondents have a more pronounced tendency to consult a specialist doctor if self-medication does not give results (21% of them) compared to female respondents (15% of these) ( $p < 0.001$ ). In the rest, the trends are similar for both categories of respondents and surprisingly a percentage of 7.5% of the respondents declared that they have never consulted a specialist doctor. The analysis of the tendency to evaluate the state of health used the following encoding: 1 – never; 2 – very rarely; 3 – at two years; 4 – once a year; 5 – at least twice a year (Figure 4d). Regarding the tendency to periodically evaluate the state of health according to the answers received, there is a similar distribution in both categories, thus 23.7% of respondents never evaluate their state of health, and 25.6% only very rarely, although the Romanian legislation allows a special set of free annual blood and urine tests for all insured persons and children ( $p = 0.74\%$ ). Only 31.8% of the respondents use to evaluate their health status annually and 10.8% at least twice a year (probably those with serious health problems), very few considering that

approximately 8% of the respondents are not insured and cannot benefit from the free annual analysis package. The same coding system was applied for to evaluation of sleep duration by gender as in the case of BMI groups distribution analysis: 1 – frequent insomnia; 2 – less than hours *per* night; 3 – over 9 hours *per* night; 4 – 7 - 9 hours *per* night (Figure 4a). The answers collected highlighted an almost double tendency towards insomnia of the female respondents (9% of these) compared to the male respondents (5% of them) and obviously a greater tendency among men towards a sleep of normal duration ( $p = 0.0049$ ). While 52.7% of the total number of respondents declared that they used to rest for 7 - 9 hours *per* night, 35.2% of respondents used to sleep less than 7 hours a night, which is insufficient in the long term. In the case of the analysis of the habit of smoking, the following coding was applied: 1 – excessively daily; 2 – daily 1 - 2 cigarettes; 3 – 2 - 3 times a week; 4 – occasionally; 5 – no (Figure 4b). In general, a similar trend can be noted regarding the habit of smoking or not, with the exception of the tendency to smoke excessively, which is much more pronounced among male respondents (21% of them) compared to female respondents (16% of these) ( $p = 0.0192$ ). The respondents who declared that they do not smoke represent 70.4% of all the participants in the survey.



**Figure 5.**

The distribution by BMI groups of a) water consumption, b) sports practice

The amount of water consumed daily was coded to be analysed as follows: 1 – under 1L; 2 – 1 L; 3 – 2 L; 4 – 3 L; 5 – over 3 L (Figure 5a). The questionnaire data indicate a percentage of 45.5% of all respondents who consume approximately 2 L of water *per* day, but also a fairly large number of respondents who do not hydrate enough during the day, 11.6% of them consume less than 1 L of water *per* day and 32.4% of

respondents consume approximately 1 L. Surprisingly, this trend of consumption expressed in percentages is also maintained for BMI groups, although the amount of water consumed should also increase with body mass, not only with physical activity. Thus, 10% of overweight respondents and 11% of obese respondents consume less than 1 L of water daily, and 31% of overweight respondents and 29% of

obese respondents consume approximately 1 L of water *per day* ( $p = 0.006$ ). Regarding physical activity, the following coding was used to analyse the habit of practicing sports: 1 – no sports/physical activity; 2 – sports/physical activity very rarely; 3 – sports/physical activity 2 - 3 times a week; 4 – sports/physical activity less than 1 hour daily; 5 – sports/physical activity at least one hour daily (Figure 5b). An increased tendency towards sedentariness was found among the respondents, 24.1% of them do not do physical or sports activities near the place and 40.3% use to do sports only very rarely. The percentage of active people who do sports daily for less than an hour or at least one hour is very small, less than 20%. The tendency towards sedentary behaviour is more pronounced among obese respondents (35% of them do not do sports and 35% do sports very rarely) and overweight (22% of them do not do sports and 43% do sports very rarely), but neither the underweight respondents are not more active either (22% of them do not do sports and 52% do very rarely). A little better in terms of physical or sports activity compared to the other BMI groups are the normal weight respondents ( $p < 0.001$ ).

### Conclusions

The study carried out through the dissemination of the questionnaire highlighted a reduced tendency among the young respondents towards a healthy diet based on a proper consumption of vegetables and fruits, but also an increased tendency of insufficient hydration of the body as well as a reduced physical activity. In the long term, these aspects can have strong negative consequences on the body, especially through the accumulation of toxins due to an insufficient consumption of antioxidants and fibre correlated with a tendency to inefficient hydration and a sedentary life. A solution is the involvement of the authorities in stimulating nutritional education from an early age, stimulating physical activity by organizing activities and public events that involve a lot of movement among the population, intensifying informative broadcasts in the field of nutrition and public health.

### Conflict of interest

The authors declare no conflict of interest.

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