

## THE IMPACT OF COVID-19 LOCKDOWN ON THE LIFESTYLE AND DIETARY PATTERNS AMONG ROMANIAN POPULATION

MAGDALENA MITITELU <sup>1#</sup>, TIBERIUS IUSTINIAN STANCIU <sup>2#</sup>, DENISA IOANA UDEANU <sup>1\*</sup>, DANIELA ELENA POPA <sup>1</sup>, DOINA DRĂGĂNESCU <sup>1</sup>, CĂLIN COBELSCHI <sup>3</sup>, NICOLETA DIANA GRIGORE <sup>1</sup>, ANCA LUCIA POP <sup>1#</sup>, MANUELA GHICA <sup>1</sup>

<sup>1</sup>“Carol Davila” University of Medicine and Pharmacy, Bucharest, Romania

<sup>2</sup>“Ovidius” University of Constanța, Constanța, Romania

<sup>3</sup>Faculty of Medicine, Transilvania University, Brașov, Romania

\*corresponding author: [denisa.udeanu@umfcd.ro](mailto:denisa.udeanu@umfcd.ro)

#Authors with equal contribution.

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### Abstract

Eating habits and changing lifestyle can impair people's health. Therefore, preserving a proper nutrition is essential, especially when the immune system is engaged in defencing the organism of viral infections like the one with SARS-CoV-2. The present paper aims to evaluate the impact of COVID-19 pandemic lockdown and state of emergency on the Romanian population lifestyle and diet changings. Consequently, the several imposed restrictions, the lockdown period and emergency states enforced a behaviour challenge for each individual. The study was conducted by means of a public survey during 8<sup>th</sup> - 26<sup>th</sup> July 2020 and included 805 adults from both rural (180) and urban areas (625). The questionnaire was disseminated online and comprised 42 questions structured in the following sections: general data (age, gender, occupation, rural/urban residence), anthropometric data (height, weight), eating habits and lifestyle changes. The processing of the collected data led to the following conclusions: the quarantine period imposed by the state of emergency in the COVID-19 pandemic changed the lifestyle of the respondents in terms of smoking habits, quantity and quality of sleep and physical activity. The normal eating behaviour of the respondents were in agreement with the general recommendations regarding the protein consumption, hydration, an enriched antioxidants diet characterized by an increased consumption of fish, fruits and vegetables and a diminished consumption of sweets, with the aim of strengthen the immune system.

### Rezumat

Obiceiurile alimentare și modificarea stilului de viață pot afecta sănătatea oamenilor, de aceea menținerea unei stări corecte de nutriție este esențială, mai ales într-o perioadă în care sistemul imunitar deține un rol important, pentru a putea combate efectele infecțiilor virale și în special efectele infecției cu virusul SARS-CoV-2. Lucrarea de față își propune identificarea modului în care populația din România și-a modificat stilul de viață și obiceiurile culinare în perioada stării de carantină decretată datorită pandemiei COVID-19 și după aceea, pe perioada stării de urgență. Alături de o serie de restricții impuse, perioada de carantină și stările de urgență au reprezentat o provocare pentru fiecare individ. Studiul s-a desfășurat sub forma unui sondaj public realizat în perioada 8 iulie - 26 iulie 2020, la care au participat 805 persoane adulte, atât din mediul rural (180) cât și din mediul urban (625), care au completat chestionarul. Acesta a fost diseminat în mediul *online* și a cuprins un număr de 42 întrebări structurate în următoarele secțiuni: date personale (vârstă, sex, ocupație, mediul de proveniență rural/urban), date antropometrice (înălțime, greutate), obiceiuri alimentare curente, modificări ale stilului de viață. Comportamentul alimentar al respondenților a fost în concordanță cu recomandările generale privind consumul de proteine, hidratarea, dieta bogată în antioxidanți caracterizată printr-un consum crescut de pește, fructe și legume, și un consum scăzut de dulciuri, cu scopul întăririi sistemului imunitar.

**Keywords:** SARS-CoV-2, COVID-19 pandemic, lifestyle changes, eating habits

### Introduction

The new coronavirus infection outbreak originated in China from an animal source similar with previous infections like severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) [1-4]. Many recent studies demonstrated that SARS-CoV-2 is highly contagious and it can be transmitted from person to person through close contact with an infected individual, mainly through respiratory drops

or direct contact with secretions [5, 6]. About one in six people who become ill develop severe symptoms and difficulty of breathing. Elderly and people with pre-existing medical problems, such as high blood pressure, other cardiovascular problems, metabolic disorders are more likely to develop a severe form of disease [6, 7]. Post-infection, several people reported an impaired capacity of physical activities with impact on work tasks and required a period of adaptation to professional activities [8-11].

The first case of coronavirus in Romania was confirmed on February 26<sup>th</sup> 2020 and on March 16<sup>th</sup> 2020, it was declared a state of emergency in order to prevent the mass spread of the new coronavirus, followed by a national lockdown, between March 25<sup>th</sup> and May 14<sup>th</sup>, 2020. Before the lockdown, in Romania there were 906 cases of people infected with SARS-CoV-2 virus positive confirmed, 86 were declared cured and 13 people diagnosed with COVID-19 infection and pre-existing chronic diseases have died. Until May 14<sup>th</sup>, 2020, on the territory of Romania, 16,247 cases of people were confirmed with the SARS-CoV-2 virus infection and of them, 9,053 were declared cured and 1,046 people have died [12]. The present situation in Romania in January 2021 revealed that more than 711,000 people were infected since the beginning of the pandemic, of which almost 654,000 patients were declared cured. After almost a year, an increasing daily number of new infections and death among people of different ages with or without known comorbidities are still reported.

In 2020, following the COVID-19 pandemic, most European Union (EU) Member States imposed a number of rules to combat the spread of the disease, including measures that had affected the jobs in many sectors of activities. The nature and extent of restrictions, such as those on the suspension of non-essential activities, differ from one Member State to another as well as between activity sectors. Thus, a significant number of workers were forced to work from home or lost their job, only some of them benefited of an income supporting system [13]. All these measures had a beneficial effect on reducing the spreading of the pandemic, but the consequences had a dramatically economical and psychological impact.

All over the world, millions of people had been forced to stay at home in solitary confinement due to general restrictions and bans. There are long-term studies showing that after a period of quarantine, people are more likely to face problems such as anxiety, insomnia or difficulties coping with stress [14-18]. No significant differences were found in this regard between gender or age. On the one part, among the most reported behaviour changes were the fear of infection, total community isolation or making exaggerated provisions and on the other part, there were people who continued their social life, some neglecting the general recommendations [19-21].

Physical distance and isolation had severely affected the lives of citizens, changing eating habits and daily behaviour. At first, there was a state of panic that caused the population to assault the food stores for purchasing daily living products, thus causing an artificial increase in consumption by achieving larger stocks than the usual need for a family [16, 22].

From the category of basic foods, products with higher validity were preferred, such as oil, corn, flour, beans, sugar, canes in large quantities and, from far,

it exceeded the usual requirements. Unfortunately, in large quantities, products from food groups with low nutritional value and high caloric intake such as preserves, pastries, sweets, chips, snacks, etc. were also purchased. The food overstocking led to an overall increased nutrients consumption, especially products at risk of spoilage. In many cases, this was one of the main issues which generated a caloric imbalance associated with a reduced physical activity during the state of emergency and many inactive people complained that they gained weight during the restrictions time [22-27]. Regarding the immune system, in order to strengthen it, it is required a healthy, balanced life-style with resting periods and a physical activity of at least 30 min *per* day. Also, general recommendations comprise a balanced and diversified diet rich in essential nutrients, appropriate to energy needs of the body that is poly-unsaturated fatty acids, fibres, micro-nutrients and optimal hydration [27-31].

It is recommended to avoid or limit alcohol consumption during the pandemic because it is addictive and weakens the immune system. Alcohol consumption can exacerbate the symptoms of depression, anxiety, fear and panic, symptoms that may intensify during isolation and quarantine [30, 32].

The present paper aims to evaluate the impact on lifestyle and diet patterns among Romanian population during the lockdown and state of emergency due to COVID-19 pandemic.

## Materials and Methods

The effect of the self-isolation and quarantine on the lifestyle and diet was estimated based on data obtained from an online questionnaire which was completed by respondents between 8<sup>th</sup> July and 26 July 2020. The questionnaire consisted of 42 questions, with a completion time of 10 - 15 minutes. The questions were structured on the following sections: personal data (age, gender, occupation, rural/urban residence and current employment), anthropometric data (height, weight), eating habits, lifestyle changes. The study enrolled 805 respondents from both rural (180) and urban areas (625) who completed the questionnaire.

### *Statistical analysis*

Statistical analysis of the collected data was performed using the open-source software R [33]. Statistical significance was accepted for alpha-level 0.05. Because some samples from our study were too small for a classical approach, we applied a robust ANOVA version for comparing our datasets [34]. We used a similar parametric framework, but with a Bootstrap approach, without worrying about basic violation about normality, homoscedasticity and sphericity [35]. Categorical variables were compared using the Chi-square test and, for samples with an estimated frequency of less than 5, we used Fisher's exact test for categorical data by Monte Carlo simulation. In order to verify the

differences between the percentages related to the categories for the same variable, we applied the Chi-square goodness of fit test.

## Results and Discussion

The survey was completed by 805 participants. Of them, 80.4% were female and 77.6% belong from urban areas. Most of the respondents are in the category of active persons and they are distributed as it follows: 35.53% between 20 and 30 years of age, 31.93% between 40 and 60 years of age and 20.12% between 30 and 40 years old. The distribution of participants according to age and gender is presented in Table I.

Regarding the occupational status, according to the data collected, the majority of respondents come from the active population: 44.1% employees, 19.5% students, 16.8% remotely workers during the quarantine period, 12% retired, and a relatively small number of people stated that they either had their activity suspended (4%), household (3%) or unemployed (0.6%). Most of the active people were part mainly from the age groups between 40 - 60 years and they did not have interruptions of normal activities during the state of emergency, asserting that they went to work as usual (44.1%). 16.8% of respondents stated that they worked remotely during the lockdown and also after that, and 3.97% of respondents had their job temporarily suspended only during the lockdown.

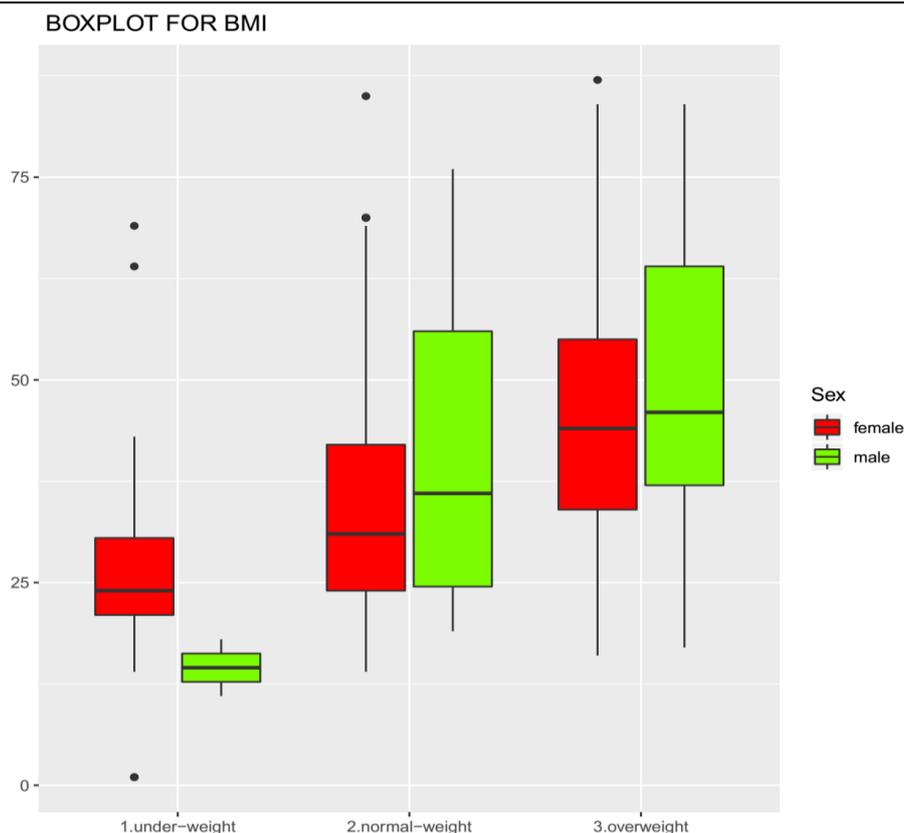
**Table I**

Demographic characteristic of study participants (n = 805)

Characteristics	n	%
<b>Gender</b>		
Male	647	80.3
Female	158	19.7%
<b>Age (years)</b>		
20 - 30	286	35.5%
30 - 40	162	20.1%
40 - 60	257	31.9%
> 60	100	12.5%
<b>Smokers</b>		
Yes	241	29.9%
No	564	70.1%
<b>Employment status</b>		
Employees	490	60.9%
Students	157	19.5%
Household	24	3%
Unemployed	5	0.6%
Activity suspended	32	4%
Retired	97	12%
<b>Working/studying from home</b>		
Yes	292	36.3%
No	355	44.1%
Not applicable	158	19.6%
<b>Body mass index (mean = 24.6 kg/m<sup>2</sup>, SD = 4.4)</b>		
Normal limits (18.5 - 24.9)	424	52.67%
Overweight category (25 - 29.9)	198	24.59%
Underweight category (< 18.5)	60	7.45%
Grade I obesity	84	10.43%
Grade II obesity	30	3.72%
Grade III obesity	9	1.11%
<b>Urbanicity</b>		
Urban	625	77.6%
Non-urban	180	22.3%

The anthropometric data collected from the questionnaire showed that most of the respondents (52.67%) had a body mass index (BMI) within normal limits, 198 respondents (24.59%) were in the overweight category, 60 respondents (7.45%) were underweight, 84 respondents (10.43%) had grade I obesity, 30 respondents (3.72%) had grade II obesity and 9 respondents (1.11%) had grade III obesity. Regarding the distribution by gender

categories and age, most underweight people were young women, while overweight people were from the category of respondents (female and male) aged between 40 and 60 plus (Figure 1). From the ANOVA analysis, we obtained a significant interaction between gender and classes of BMI ( $p = 0.027$ ) and a significant difference between the three classes related to BMI ( $p = 0.001$ ).



**Figure 1.**  
BMI distribution by age and gender

*Lifestyle changes during COVID-19 emergency state and lockdown*

During COVID-19 emergency state and lockdown, the group behaviour undergone a series of changes that are highlighted from the data revealed by the questionnaire answers. Thus, 45.8% of respondents said that they emphasized more the cleanliness, 37.8% of respondents became more attentive to the quality of food consumed, aware of the need for food, balanced to maintain a healthy lifestyle and 21.5% of respondents said they gave up a number of unhealthy habits. The two months lockdown period also had negative effects

on the population: 23.4% of respondents claimed a deterioration in the psycho-emotional state, 20.7% of respondents said that they felt a worsening of sleep quality and 18.9% of respondents stated that their income and quality of life had deteriorated.

Moreover, the lockdown period in the COVID-19 pandemic influenced the quality and duration of sleep. The number of sleep hours was increased in case of 2.4% respondents and insomnia increased by 1.8% people during the lockdown. The distribution of respondents according to the number of sleep hours during the night is presented in Table II.

**Table II**

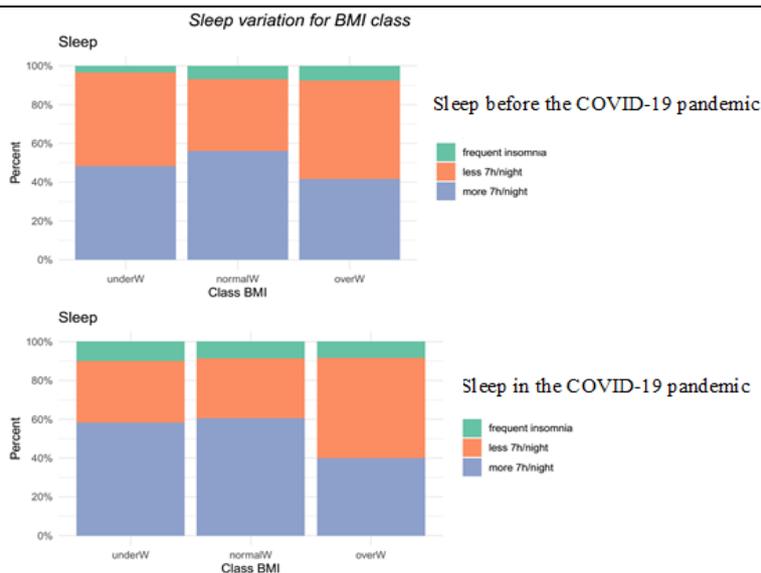
Sleep pre- and during COVID-19 pandemic (n = 805)

Variables	Pre-COVID-19 n (%)	During COVID-19 n (%)	p-Value
<b>Hours of sleep per night</b>			
< 7 h	350 (43.4%)	316 (39.3%)	p < 0.001
> 7 h	401 (49.8%)	420 (52.2%)	
Insomnia	54 (6.8%)	69 (8.6%)	

Regarding the quality of sleep during the night by BMI categories, it was noted that in the pre-COVID-19 pandemic period, the underweight people represented the category with the lowest percentage of insomnia (3%), while during the COVID-19 pandemic period the percentage of those with insomnia in the underweight category increased significantly (10%). A slightly increased (1%) of the normal and overweight people with insomnia was noticed during the COVID-19

pandemic. The quality of sleep undergone significant changes under the pandemic impact, in the case of underweight and normal weight people, in comparison with the overweight people with no significant variations (Figure 2).

Pearson's Chi-squared test showed a significant association between variables, p value < 0.001 for the period before and after the lockdown and emergency state.



**Figure 2.**

The influence of the COVID-19 pandemic on the quality of sleep in BMI classes

Decreased physical activity associated with other sedentary behaviours leads to obesity, a major public health problem worldwide. The study revealed that 41.1% of respondents are sedentary, 25.3% rarely play sports and only 13.8% usually exercise daily

according to the data presented in Table III. During the lockdown period, there is a slight decrease in the tendency to do sports among the active population groups.

**Table III**

Physical activity pre- and during COVID-19 pandemic (n = 805)

Variables	Pre-COVID-19	p-Value	During COVID-19
Categories of physical activity - doing sports	n (%)		n (%)
2 - 3 times/week	159 (19.8%)	p = 0.031	141 (17.5%)
Every day	111 (13.8%)		81 (10.1%)
Rarely	204 (25.3%)		236 (29.3%)
None	331 (41.1%)		347 (43.1%)



**Figure 3.**

The influence of the COVID-19 pandemic on the physical activity of overweight people

An increasing in the sedentariness was significant among overweight people (Figure 3). Pearson's Chi-squared test showed a significant association between gender and frequency of playing sport only before

COVID period (p = 0.031). Travel restrictions imposed by the lockdown correlated with the increasing trend in the number of hours of sleep led to body weight fluctuations. Thus, 39.1% of respondents said they

noticed an increase in weight and only 15% of respondents said that they noticed a weight loss during the lockdown period.

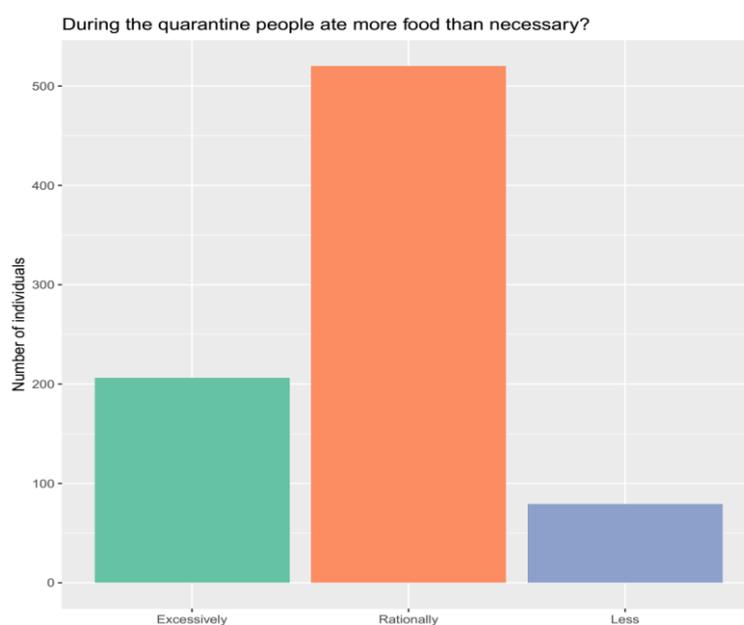
Regarding the habit of smoking, a significant number of respondents were non-smokers (70.1%), only 29.9% of respondents were smokers. 17.8% of the smokers said they consumed more cigarettes than usual during the lockdown and 1.8% of respondents said they quit smoking during the lockdown.

*Eating habits changes during COVID-19 emergency state*

During the lockdown period, the feeling of hunger or satiety changed for a majority of respondents, as follows: 15.9% of respondents had lost appetite, while 28.4% of respondents said that their appetite increased and 55.7% of respondents stated that they did not

identify a change in appetite. 52.9% did not change their eating behaviour during the state of emergency, while 16.5% of respondents stated that they missed one or more main meals a day, and 13.8% of respondents claimed that they introduced one or more snacks.

Within the studied group, 64.6% of the respondents asserted that they did not change their eating habits during the lockdown period regarding the rational food consumption according to the energy needs, while 35.4% of the respondents stated that they had changes in eating habits by eating excessively (25.6%) or by reducing food intake (9.8%). Data are presented in the Figure 4. The Chi-square goodness of the fit test showed a significant difference between the three highlighted categories ( $p < 0.001$ ).



**Figure 4.**  
Evaluation of food consumption during the lockdown period

Although only 25.6% of the subjects declared that they consumed more food during the lockdown period, the perception on the body weight increase was found in a higher percentage of respondents, respectively 39.1%. This may be explained that during the quarantine period, with travel restrictions and lack of physical activity, the body's energy needs were lower than the caloric intake provided by food consumption, which remained constant.

Most of the respondents stated that during the lockdown, they purchased food and other necessary products from the supermarket or the central market (547 persons, 68%) or from the shops near the house (444 persons, 55.2%). A relatively small number of subjects (125 persons, 15.5%) used online services. There were a small number of people who stated that they did not go shopping and delegated purchases to third parties (36 persons, 4.5%). Although, most Romanians preferred

shopping from stores, supermarkets or markets, there was a growing trend for online product purchases during the lockdown period (Table IV).

**Table IV**  
Shopping practices during COVID-19 pandemic (n = 805)

Variables	n	%
<b>Shopping purchase</b>		
Supermarket/central market	547	68%
Shops near house	444	55.2%
Online grocery	125	15.5%
Delegated purchases to third parts	36	4.5%
<b>Reading food labels</b>		
Yes	561	69.7%
No	244	30.3%

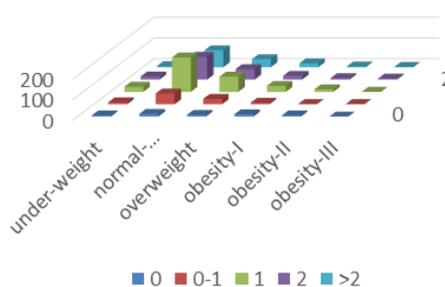
Regarding the aspect that is taken into account when purchasing a product, 69.7% of respondents said that when purchasing a food product, the nutritional

value was more important and less the price of the product which means that most respondents were aware of the importance of food quality for health (Table IV). A relatively small percentage of respondents (16%) purchased the food products in various promotional campaigns.

The trend for consumption of healthy foods increased as an awareness of the need to support the immune system through a balanced diet. An increased in the consumption of vegetables and fruits (34.2%), meat and meat products (27.1%) were noticed among respondents. The less preferred food during the lockdown period were chips and snacks. 49.9% of respondents stated that they consumed healthier food during the lockdown period, while 10.6% of respondents encountered difficulties in consuming healthy food due to the financial difficulties they have been facing during this period and 39.5% of respondents had no access to healthier foods.

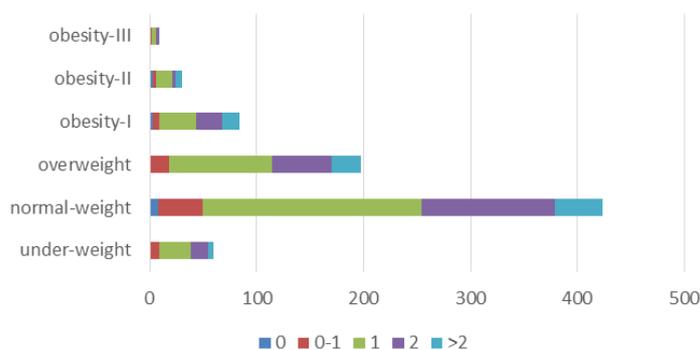
The questionnaire also aimed to assess food consumption by food categories during the lockdown period. There was an increasing trend in the consumption of food prepared at home both during the lockdown period (77.5% of respondents) and before this period (70.8%) to the detriment of fast-food or home-ordered foods. Regarding the consumption of vegetables and fruits according to the processed data, the following aspects were noted: 38.3% of the respondents stated that they usually consumed only one portion of fruit *per day*

and 47.6% only one portion of vegetables *per day*, 25.6% usually consumed two or three portions of fruit *per day* and 28.4% usually consumed two servings of vegetables daily, only 12.4% usually consumed more than two servings of fruit *per day* and 18.8% usually consumed more than two servings of vegetables daily. About 10% of the respondents rarely ate fruits and vegetables. Correlating these data with the recommendations of the World Health Organization [29] on the consumption of fruits and vegetables for a healthy lifestyle, a relatively low number of people considered, for the study used, to consume more than two servings of vegetables and fruits daily (less than 20% of respondents). According to Figures 5 and 6, this trend was observed in the respondents from all weight categories in the analysed sample.



**Figure 5.**

Daily consumption fruits by BMI categories during COVID-19 emergency

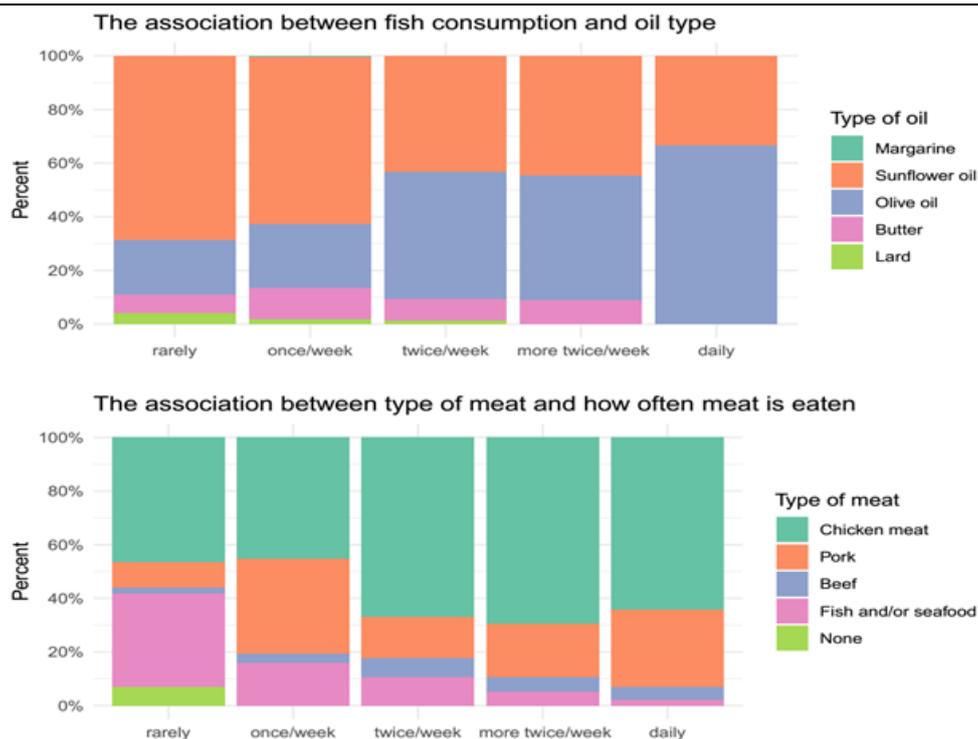


**Figure 6.**

Daily consumption vegetables by BMI categories during COVID-19 emergency

Specific to the Romanian agriculture is the cultivation of sunflower and therefore sunflower oil is commonly used as the main dietary fat. This aspect is also highlighted in the answers obtained from the survey: 62.2% of the participants used sunflower oil as their main source of fat in their diet. Only 26% of the respondents used olive oil as an alternative, and butter was used mainly in diet by 8.8% of respondents. However, there is also a percentage of 2.9% of respondents who used lard in their daily diet (Figure 7). Fisher's Exact Test for Count Data with simulated p-value showed a significant association between the two categorical variables studied ( $p < 0.001$ ).

Regarding meat consumption, 37.1% of respondents consumed animal protein daily, 39.8% of respondents consumed meat more than twice a week and 13.9% consumed meat twice a week. There are also people who rarely ate meat, once a week (5.3%) or rarely or not at all (3.9%). 65% of the respondents ate poultry meat, 22% of the respondents ate pork, 7% of the respondents ate fish or seafood and only 3.5% beef meat (Figure 7). Also, Fisher's Exact Test for Count Data with simulated p-value showed a significant association between the two categorical variables studied ( $p < 0.001$ ).

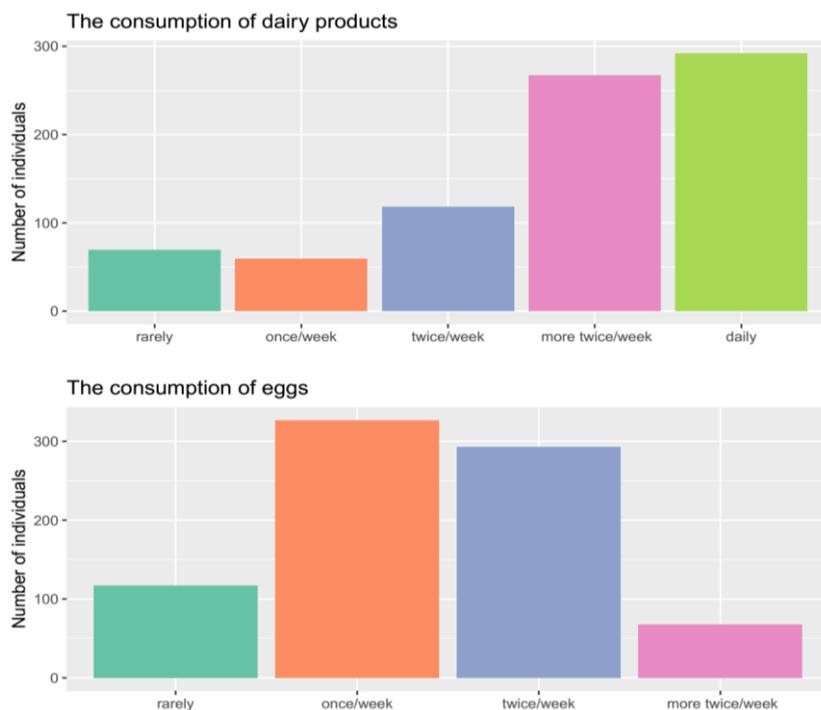


**Figure 7.**

The consumption of dietary fats and type of meat during COVID-19 emergency

Milk or dairy products were preferred by 36.3% of respondents, 33.2% of subjects stated that they usually consume more than two servings of dairy products *per* week, and 8.6% rarely consumed it or not at all. Most respondents said they usually ate 1 - 2 eggs a

week and only 15% consumed very rarely (Figure 8). Concerning consumption of both types of food, a significant p value ( $p < 0.001$ ) was obtained from analysis of the Chi-square goodness of fit test.



**Figure 8.**

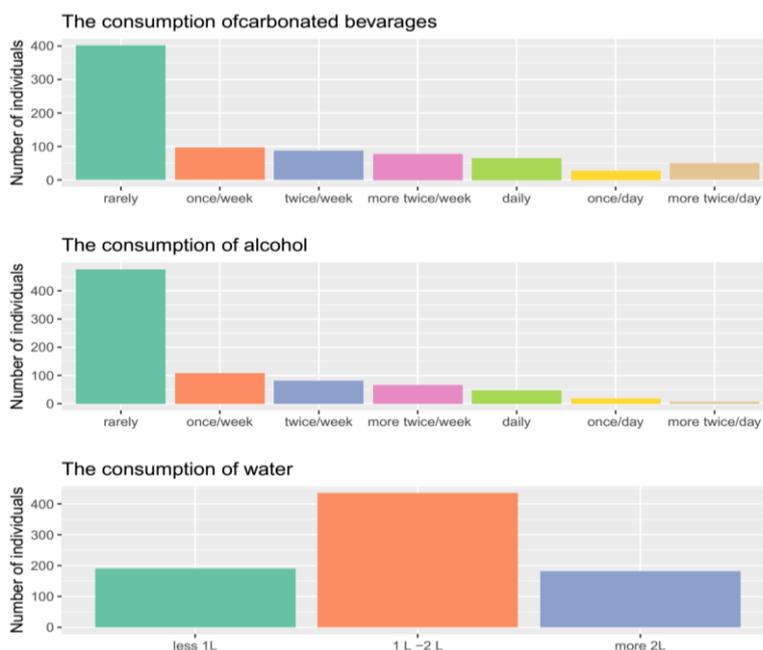
The consumption of dairy products and eggs during COVID-19 emergency

The consumption of carbonated beverages had a decreasing trend among the consumers comparing to sweets. Thus, 49.8% of the respondents stated that they consumed very rarely or not at all carbonated drinks while 17.8% of the respondents used to consume one or more portions of carbonated drinks daily (X-squared statistic: 857.42,  $p < 0.001$ ) (Figure 9).

Regarding the habit of consuming alcohol, a decreasing tendency of consumption was observed as in the case of the consumption of carbonated drinks. Thus, 59.1%

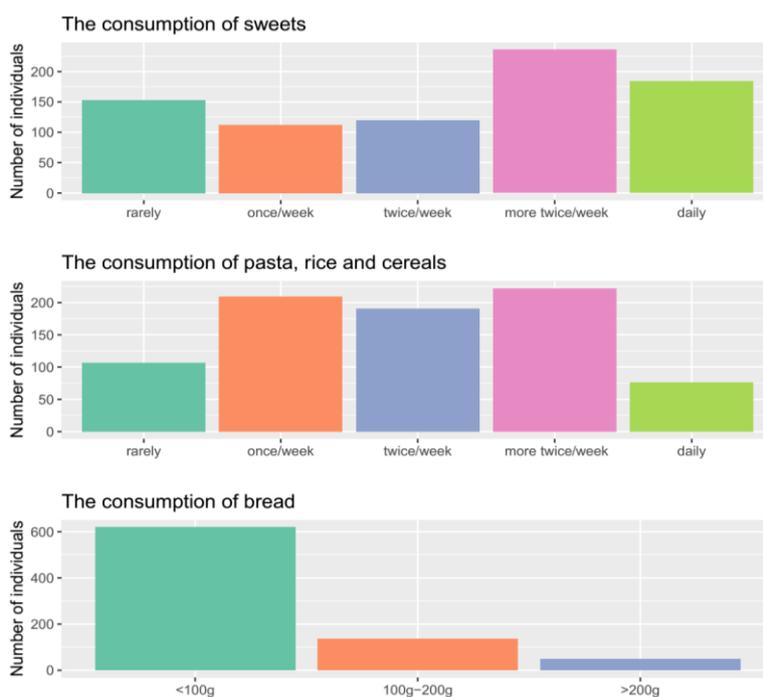
of respondents tended to consume alcohol very rarely or not at all and only a small percentage of respondents (8.7%) tended to consume alcohol daily (X-squared statistic: 1388.4,  $p < 0.001$ ) (Figure 9).

According to the processed data, there was a normal tendency of hydration among the respondents in the analysed sample. 76.5% of all respondents tend to consume more than 1 L of water daily and only 23.5% of respondents consumed less than 1L of water daily (X-squared statistic: 155.4,  $p < 0.001$ ) (Figure 9).



**Figure 9.**

The consumption of carbonated beverages, alcohol, and water during COVID-19 emergency



**Figure 10.**

The consumption of sweets, pasta, rice, cereals and bread during COVID-19 emergency

23.4% of the respondents stated that they consumed sweet products daily, 29.2% usually consumed sweet products more than twice a week and 19.1% of the respondents stated that they tend to consume sweet products quite rarely (X-squared statistic: 63.9,  $p < 0.001$ ) (Figure 10).

Regarding the consumption of pasta, rice and cereals, there is a moderate consumption, 27.6% of respondents usually consumed more than two servings *per week* and only 9.4% of respondents consumed this category of food daily (X-squared statistic: 106,  $p < 0.001$ ) (Figure 10).

The daily bread ration is mainly between 1 and 4 slices of bread daily for 52.3% of respondents, which is a moderate consumption. 24.7% of the subjects rarely consumed bread and the rest, 23% of the respondents, tended to generally consume daily a larger amount of bread (X-squared statistic: 668.4,  $p < 0.001$ ) (Figure 10).

It is acknowledged that this study has limitations related to the use of self-reported questionnaire, and the cross-sectional study design, which can lead to misreporting of data. The study information was acquired after lockdown, and although comparisons are critical to be made in order to draw inferences, conclusive remarks are difficult to draw. However, the number of subjects enrolled in the study was not as large as in other studies from other countries, maybe due to the strongest and difficult situation around our country from March to May.

## Conclusions

The social impact of the COVID-19 pandemic in our modern society is major and unique with long-term implications on people's lifestyles globally. The lifestyle and eating habits of Romanians have undergone a series of significant changes during the COVID-19 emergency. Some changes had a positive impact, they became more attentive to cleanliness, they became more carefully, while others had a negative impact. Some respondents affirmed that both the quality of life and the psycho-emotional state deteriorated. At the beginning of the pandemic, there was a trend of additional supply to some respondents who focused more on the purchase of basic products and products needed for disinfection and cleaning. Limiting travel during the lockdown period has increased the tendency to sedentary and has led to weight gain for some people, but also an alteration in sleep quality or a tendency to consume more food. A positive aspect of the crisis caused by the COVID-19 pandemic is the fact that, during the quarantine and post-quarantine period, the population of Romania consumed a higher amount of homemade food. There was also an increase in the consumption of fruits and vegetables and a decreasing trend in the consumption of sweets, chips and snacks.

## Conflict of interest

The authors declare no conflict of interest.

## References

1. Coronaviridae Study Group of the International Committee on Taxonomy of Viruses, The species severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. *Nat Microbiol.*, 2020; 5: 536-544.
2. Bogoch II, Watts A, Thomas-Bachli A, Huber C, Kraemer MU, Pneumonia of unknown etiology in Wuhan, China: potential for international spread via commercial air travel. *J Travel Med.*, 2020; 27(2): 1-3.
3. Wang C, Horby PW, Hayden FG, Gao GF, A novel coronavirus outbreak of global health concern. *Lancet.*, 2020; 395: 470-473.
4. Singhal T, A Review of Coronavirus Disease-2019 (COVID-19). *Indian J Pediatr.*, 2020; 87(4): 281-286.
5. Velavan TP, Meyer CG, The COVID-19 epidemic. *Trop Med Int Heal.*, 2020; 25: 278-280.
6. Abenavoli L, Cinaglia P, Luzza F, Gentile I, Boccuto L, Epidemiology of coronavirus disease outbreak: the Italian trends. *Rev Recent Clin Trials.*, 2020; 15(2): 87-92.
7. [www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters](http://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters).
8. WHO. Coronavirus disease (COVID-19) outbreak, [www.who.int/emergencies/diseases/novel-coronavirus-2019](http://www.who.int/emergencies/diseases/novel-coronavirus-2019).
9. Paules CI, Marston HD, Fauci AS, Coronavirus Infections-More than Just the Common Cold. *JAMA.*, 2020; 323(8): 707-708.
10. [www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](http://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)).
11. [www.who.int/health-topics/coronavirus#tab=tab\\_2](http://www.who.int/health-topics/coronavirus#tab=tab_2).
12. Pantea Stoian A, Pricop-Jeckstadt M, Pana A, Ileanu BV, Schitea R, Geanta M, Catrinioiu D, Suceveanu AI, Serafinceanu C, Pituru S, Poiana C, Timar B, C Nitipir, S Parvu, Arsene A, Mazilu L, Toma A, Hainarosie R, Ceriello A, Rizzo M, Jinga V, Death by SARS-CoV 2: a Romanian COVID-19 multi-centre comorbidity study. *Sci Rep.*, 2020, 10: 21613: 1-11.
13. Radulescu CV, Ladaru GR, Burlacu S, Constantin F, Ioanăș C, Petre IL, Impact of the COVID-19 pandemic on the Romanian labor market. *Sustainability.*, 2021; 13(1): 271: 1-23.
14. Górnicka M, Drywień ME, Zielinska MA, Hamułka J, Dietary and lifestyle changes during COVID-19 and the subsequent lockdowns among Polish adults: a cross-sectional online survey PLifeCOVID-19 study. *Nutrients.*, 2020; 12(8): 2324: 1-20.
15. Kumari A, Ranjan P, Vikram NK, Kaur D, Sahu A, Dwivedi SN, A short questionnaire to assess changes in lifestyle-related behaviour during COVID 19 pandemic. *Diabetes Metabol Syndr.*, 2020; 14(6): 1697-1701.
16. Balanzá-Martínez V, Atienza-Carbonell B, Kapczinski F, de Boni RB, Lifestyle behaviours during the COVID-19 – time to connect. *Acta Psychiatr Scand.*, 2020; 141(5): 399-400.

17. Di Renzo L, Gualtieri P, Pivari F, Soldati L, Attinà A, Cinelli G, Eating habits and lifestyle changes during COVID-19 lockdown: an Italian survey. *J Transl Med.*, 2020; 18(1): 229: 1-15.
18. Yuan S, Liao Z, Huang H, Jiang B, Zhang X, Wang Y, Comparison of the indicators of psychological stress in the population of Hubei province and non-endemic provinces in China during two weeks during the coronavirus disease 2019 (COVID-19) outbreak in February 2020. *Med Sci Monit.*, 2020; 26: e923767: 1-10.
19. Dragoi AM, Radulescu I, Nasui BA, Pop AL, Varlas VN, Trifu S, Clozapine: An Updated Overview of Pharmacogenetic Biomarkers, Risks, and Safety-Particularities in the Context of COVID-19. *Brain Sci.*, 2020; 10(11): 840: 1-24.
20. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*, 2020; 395: 912-920.
21. Rehman U, Shah Nawaz MG, Khan NH, Kharshiing KD, Khurshed M, Gupta K, Depression, anxiety and stress among Indians in times of Covid-19 lockdown. *Community Ment Health J.*, 2020; 57: 42-48.
22. Narici M, De Vito G, Franchi M, Paoli A, Moro T, Impact of sedentarism due to the COVID-19 home confinement on neuromuscular, cardiovascular and metabolic health: physiological and pathophysiological implications and recommendations for physical and nutritional countermeasures. *Eur J Sport Sci.*, 2020; 12: 1-22.
23. Cellini N, Canale N, Mioni G, Costa S, Changes in sleep pattern, sense of time and digital media use during COVID-19 lockdown in Italy. *J Sleep Res.*, 2020; 29(4): e13074: 1-5.
24. Leech RM, Worsley A, Timperio A, McNaughton SA, Understanding meal patterns: definitions, methodology and impact on nutrient intake and diet quality. *Nutr Res Rev.*, 2015; 28(1): 1-21.
25. Khayyatzadeh SS, Nutrition and infection with COVID-19. *J Nutr Food Security*, 2020; 5(2): 93-96.
26. Wypych TP, Marsland BJ, Ubags ND, The impact of diet on immunity and respiratory diseases. *Ann Am Thorac Soc.*, 2017; 14: 339-347.
27. Drăgoi CM, Moroșan E, Dumitrescu IB, Nicolae AC, Arsene AL, Drăgănescu D, Lupuliasa D, Ioniță AC, Pantea A, Stoian CN, Rizzo M, Mititelu M, Insights into chrononutrition: the innermost interplay amongst nutrition, metabolism and the circadian clock, in the context of epigenetic reprogramming. *Farmacia*, 2019; 67(4): 557-571.
28. FAO, 2020. Maintaining a healthy diet during the COVID-19 pandemic. Rome, [fao.org/publications/CA8380EN](http://fao.org/publications/CA8380EN).
29. [www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/technical-guidance/food-and-nutrition-tips-during-self-quarantine](http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/technical-guidance/food-and-nutrition-tips-during-self-quarantine).
30. [www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi](http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi).
31. Arsene AL, Dumitrescu IB, Dragoi CM, Udeanu DI, Lupuliasa D, Jinga V, Draganescu D, Dinu-Pirvu CE, Burcea Dragomiroiu GTA, Blejan IE, Moisi RE, Nicolae AC, Moldovan H, Popa DE, Velescu BS, Ruta S, A new era for the therapeutic management of the ongoing COVID-19 pandemic. *Farmacia*, 2020; 68(2): 185-196.
32. Burcea Dragomiroiu GTA, Ginghina O, Radulescu FS, Lupuleasa D, Bârcă M, Popa DE, Negrei C, Miron DS, *In vitro* screening of alcohol-induced dose dumping phenomena for controlled release tramadol tablets. *Farmacia*, 2015; 63(5): 670-676.
33. R Core Team, R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria, 2019, [www.R-project.org](http://www.R-project.org).
34. Mair P, Wilcox R, Robust Statistical Methods in R Using the WRS2 Package. *Behavior Res Meth.*, 2020; 52: 464-488.
35. Albeanu G, Ghica M, Popentiu-Vladicescu F, On using bootstrap scenario-generation for multi-period stochastic programming applications. *Int J Computers Comm Control*, 2008; 3: 156-161.