

# The influence of the COVID-19 pandemic on lifestyle – a pilot study

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## ABSTRACT

**Aim.** Because the COVID-19 pandemic is a topic of interest in the literature due to its information dynamics and, also, to its impact on the population health status; we wanted to highlight the connection between pandemic and lifestyle, with an emphasis on eating habits.

**Material and methods.** A questionnaire with 20 items about sociodemographic data and information about eating habits was distributed.

**Results.** Data collected reflected how COVID-19 pandemic influenced the employment status, level of income, smoker status, consumption of fruits, vegetable, candies, sweets, chocolate and fast-food of the respondents. The reported dietary changes were reflected both positively by more regular meals, a slight increase in the consumption of fruits and vegetables, lower consumption of fast food and higher cooked food, and negatively by a higher intake of sweets, candies and chocolate and as a result of an increasing in the habit of compulsive eating.

**Conclusion.** The trait that easily weighed on all the activities of this period is the perceived level of stress and anxiety.

**Keywords:** COVID-19, health status, lifestyle, eating pattern, sleep, anxiety, depression

## INTRODUCTION

In the case of an infectious disease outbreak, the population is exposed to a high level of stress, being forced to react and to psychologically adapt to the novel conditions, facts that play an important role

both in the spreading pattern of the disease and in the evolutive pattern of the emotional response and the psychosocial disorders during and after the outbreak. Despite the high impact on life quality and health status, usually the tendency is to provide in-

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sufficient resources to manage or diminish the pandemic effects on mental health and well-being, because its impact tends to be minimized (1). The first diagnosed case of SARS-COV-2 virus infection (COVID 19) was detected in December 2019 in Wuhan, China (2), on January 30, 2020 the World Health Organization declares that the outbreak of COVID-19 is an international public health emergency (3), since then, more than 200 countries and territories around the world have been affected (2), with 251 million cases and over 5 million deaths by November 2021.

COVID-19 virus is a highly contagious virus related to severe acute respiratory syndrome (SARS-COV) and several others bat coronaviruses (4,5). Its dominant aerogenic transmission along with its clinical presentation that varies between asymptomatic, mild and severe respiratory symptoms and with the high available mobility lead to a global pandemic (6-8).

A change in the environment generates anxiety, insecurity and stimulates the individual to develop adaptative behaviours, fact that is amplified in case of infectious disease outbreaks, especially when the threat gains global proportions, leading to unclear results, rumours and a high level of suspicion (9). The unpredictability and uncertainty of the COVID-19 pandemic, alongside with its associated lockdowns, physical and social distancing and isolation recommendation, evolved on the basis of a newly developed financial crisis, was felt by the individuals as a threat and, secondary, it increased the risk of mental health problems development and exacerbated health inequalities (10).

In Romania, after the first case was confirmed, the authorities began to take distancing measures, but soon declared emergency national emergency situation and ordered a national lockdown. This fact leads to limitations in: social interaction, availability of certain food products, recreative activities and, finally, work opportunities, so the individual life was severely influenced on all levels, from the quality of their meals, to the capacity to express themselves freely. Currently, 1.72 million cases and over 51 thousand deaths have been declared on the territory of our country.

Romania is a country similar to its neighbours, with poor inhabitants, low accessibility to health prophylaxis programs with high rate obesity, so we wanted to assess the COVID-19 pandemic impact, in order to be able to decrease the future burden both locally and regionally.

## AIM

The purpose of this study was to highlight the impact of the SARS-COV-2 pandemic on lifestyle, with an emphasis on eating habits.

The main objective of this pilot-study is to explore and evaluate the actual situation regarding the lifestyle changes perceived secondary to COVID-19 pandemic, in a cohort from Romania and their link with the perceived stress level. Data were collected during November 2020 and July 2021, using an international questionnaire structured in two distinct parts, the first part includes descriptive socio-demographic information and the second part contains information about the eating patterns. The questions were created on the basis of a validated questionnaire from India, which evaluates the changes of lifestyle and diet during the pandemic. The questionnaire standardized development included literature reports and experts' evaluation. It consists of 20 questions that cover all the important information needed to assess eating habits (intake, type of meal and snack consumption), physical activity (duration and type) and sleep (duration and quality). The dietary elements of the questionnaire assess the consumption of main meals, snacking habits, consumption of healthy foods such as whole grains, fruits and vegetables, eggs, nuts and consumption of unhealthy foods such as junk food or sugar-sweetened products (11).

## MATERIAL AND METHODS

A questionnaire with 20 items about socio-demographic data and information about eating habits was distributed to a group whose members were informed about the objectives of the current study. The patient selection was arbitrary and consecutively presented, trying to have a wide representation of the population group.

Group characteristics consisted of 1000 respondents, 87% females and 13% males; the respondents were 62.8% in the group age between 20 and 41 years old, 23.4% between 0 and 20 years old, 12.7% between 41 and only 7% over 60 years old; 76% from urban settlement; 50% had high school degree, 35% presented a college degree, and the rest finished educational programs inferior to the high school such as gymnasiums or professional schools; 50% of respondents were employed and 50% were unemployed.

Descriptive, correlation and association statistical tests were applied, namely the Chi-square test and the Pearson correlation coefficient. In the analysis, the coefficient of statistical significance,  $p \leq 0.05$ , was chosen as the significance threshold. Excel and SPSS software were used to collect and analyse the data.

Consent to participate in the study was requested from each participant. The Ethics Committee of the National Institute of Research and Development

for Food Bioresearches, Bucharest, Romania assessed and approved the study.

**RESULTS**

During the COVID-19 pandemic, job loss was encountered in 7.74% of respondents, while 33.4% of respondents encountered an income change – 46.61% with an income increase and 53.31% with an income decrease.

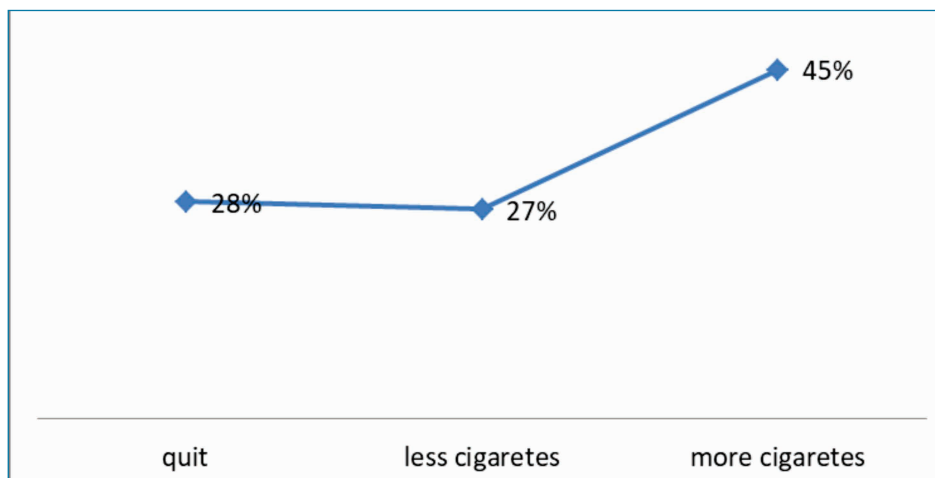
Smoking had a prevalence of 37% of respondents, with a positive trend, respectively, 45% of non-smokers started during pandemic, while only 28% ceased to smoke and 27% decreased their daily cigarettes intake (Figure 1).

The positive changes in the alimentary pattern during pandemic consisted in: an increase of 18% more regular meals, 44% diminished fast-food eating, a 40% increment of fruit and vegetables eaten, a 63% increased desire to read new recipe and to cook, 46.8% desire to inform about nutritional information for a better nutritive intake.

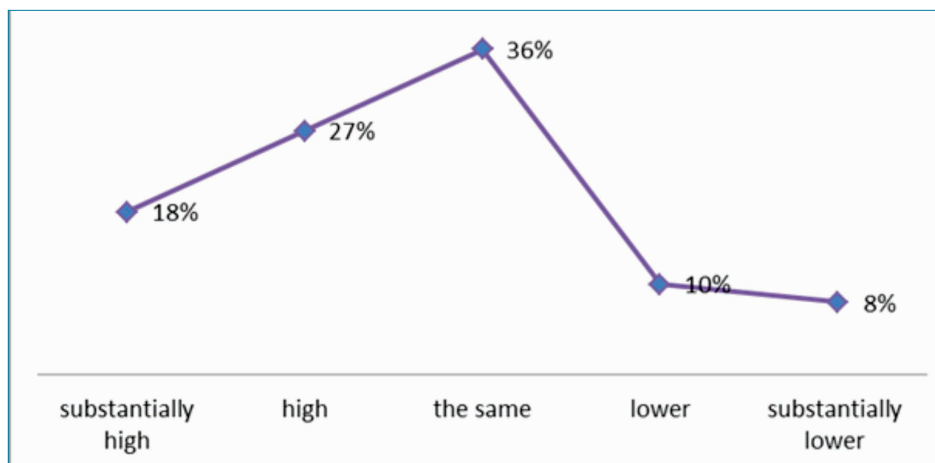
On the other hand, the negative aspects modified by the pandemics are a 35% higher incidence of irregular meals pattern, a 43% similar amount of eating fruits and vegetables, a 45% increment of compulsive snacking (Figure 2), and a 46% increment in the sweets, candies and chocolate eaten.

The activity distribution pattern encountered an increase of the time for family activities and household chores of 54.5% respondents; a poorer sleep quality for 38.5% of respondents and an increase of time spent in front of a screen – TV, PC or phone for 52% of respondents (Figure 3).

A very important aspect of the responses is the self-perceived anxiety level, respectively, a 60% of respondents encountered a higher level during this period (Figure 4). Moreover, the anxiety level, positively correlated with a poorer alimentary pattern ( $r = 0.0339, p < 0.001$ ), sleep quality ( $r = -0.0333, p < 0.001$ ), time for physical activities ( $r = -0.111, p < 0.001$ ) and a higher compulsive snacking and time spent in front of a screen of TV, PC or phone ( $r = 0.213, p < 0.001$ ) (Figure 5).



**FIGURE 1.** The evolution of smoking behaviour during the pandemic



**FIGURE 2.** Distribution of compulsive snacking perception during the pandemic

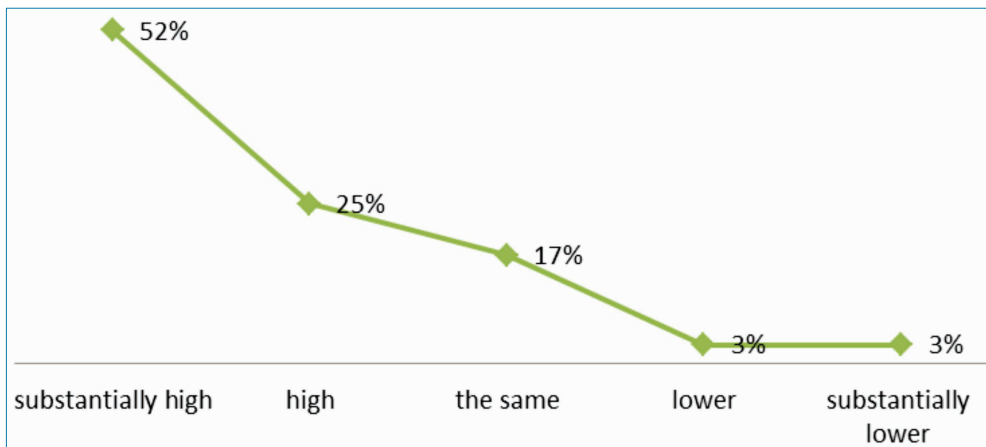


FIGURE 3. Perception of time spent in front of the screen

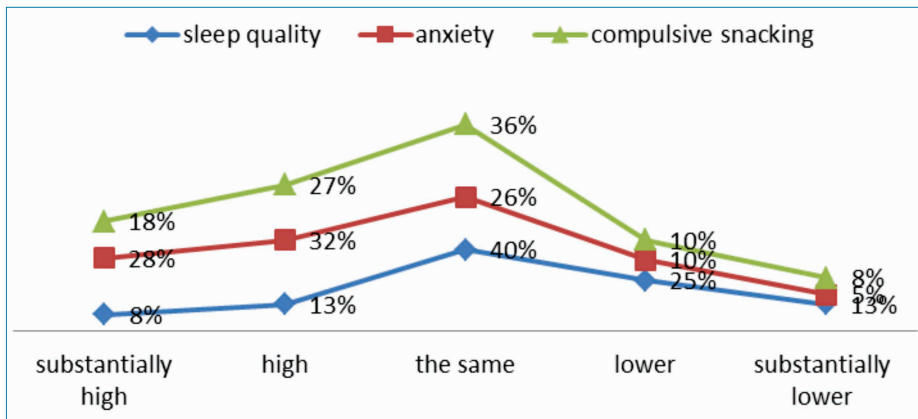


FIGURE 4. Perception of anxiety during the pandemic

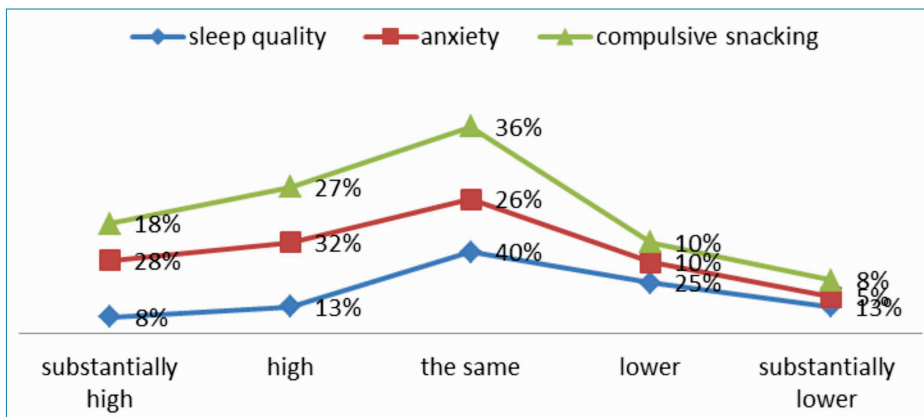


FIGURE 5. The correlation between anxiety, sleep quality and compulsive snacking

**DISCUSSION**

COVID-19 pandemics changed differently the lifestyle of the population including eating, physical activity, sleep or smoking; as shown in the further literature reported data. It is important to emphasize that the cohort is not representative for the general population, that the number of respondents who answered the questionnaire cannot be quantified and that the majority of responses were submitted during December 2020 and march 2021 when the general restrictions implemented, did not

varied significantly and included the mandatory use of mask in crowded places, limited social, cultural or sportive events (12). We also noticed a predominantly female responders, which biases certainly the accuracy of the answers but since our group was not representative, it was not a reason to weight data during our analysis. It is well known that women are more interested in healthy life aspects, and this might explain the imbalance in gender representation (13-15). It is a confirmation that what was found elsewhere, is also applicable in Ro-

mania and it has an important meaning for the entire family's lifestyle, since in this country women are still generally responsible for cooking in households. Food literacy, the general improvement in the perception of having more time, policies to stay at home/work from home, educational attainment, loss of income, age during COVID-19 as was reported by De Backer et al., led to an increase in planning, selecting, and preparing healthier foods in both females and males, reading of food labels and nutrition information among females, but the financial and psychological stress, counteract them (16).

Henchion et al. reported that lockdown in Ireland decreased the rate of people personally making their shopping and physically going to the supermarket, which, though, remained the main source of shopping and, interestingly is the appearance of a stockpiling behavior with the top three foods being pasta/rice, eggs and flour (17).

For Denmark, Germany and Slovenia, during lockdown, Janssen et al. reported that people shopped less frequently with an overall reduction in the consumption of fresh foods, but an increase in the consumption of food with a longer shelf life in Denmark and Germany. An interesting evolution was observed by the modifications in the frequency of consumption depending of factors such as restrictions - closure of physical workplaces, canteens, cafés and restaurants, schools, and childcare institutions; perceived risk of income loss, changes in frequency of grocery shopping and socio-demographic factors and, very important, by the different food cultures (18).

Murphy et al. reported on a sample of 2,360 adults from three continents, respectively the Island of Ireland, Great Britain, United States of America (USA) and New Zealand, that the changes in food consuming practices during COVID-19 pandemics varied significantly between regions, excepting the USA, where cooking practices varied less. The modified food practices were secondary also to bulk buying and included increased fruit and vegetables intake, in parallel with an increase of saturated fat intake should raise an alarm sign because of the additional pressure put on the individuals' physical and mental health, which could alter a balanced diet (19).

A PwC survey on the consumers behaviors reported that more than half are oriented towards eco-friendly and more sustainable products, while the price is very important in more than two thirds of the respondents not regarding to the mode of buying – onsite or online (20).

Taking into consideration the chronic non-transmittable pandemics that include obesity and diabetes mellitus and that the population have excessive

weight gain and an unhealthy lifestyle, the effect of COVID-19 pandemics is an additional burden for exacerbating them (21). The pandemic period challenge is represented by the increase in unhealthy patterns such as less physical activity, unhealthier diet, longer time spent in front of a screen and by its psycho-social consequences on health such as the fear, anxiety, depression and sleep disorders that it favors. The present study accentuates its dynamic pattern, respectively, a more regular eating pattern, an improvement of compliance with the meal schedule, a slightly higher tendency to consume more fruits and vegetables and a lower consumption of fast food and fried food, but not every changes are positive, such are the results of the study conducted by Chopra et al., where an overwhelming proportion of 81.6% of respondents refrained from consuming fruit and vegetables and in the healthy group, three quarters of participants reduced the unhealthy types of foods, while in the unhealthy group there was an increase of 20% (22). What is important to emphasize is that we have to start to act short-term, from now, in order to offer solutions of health policies to prevent behaviors such as longer time spent in front of screens, lower amount of physical activities and so on, through the actual programs of recommending regular physical activities; but also, to think and act long-term, by developing the already existing policies and developing new ones, in order to counteract the negative effect of the changes that are taking place. What is important to address and to analyze further, because of its hidden repercussions is the psychological impact that favors the development of negative behaviors such as insomnia or compulsive snacking.

Romania is a country with 43.6% rural population (23), a minimum wage of 466.72 Euros/months (24) and 1.58 million of inhabitants earning the minimum wage (25) and working in only on-site jobs, so the pandemic period seriously influenced their lifestyle. Moreover, the low level of trust in the public authorities led to a high reluctance and, secondary, a low COVID-19 vaccination rate of only 40% after almost one year from the vaccination campaign start (26). Even if the respondents are atypical, respectively they have a high income alongside with a high level of education and wide internet access, in Romania, the general population, despite the high prevalence of chronic non-transmittable disease, isn't supported by the government in order to have access to screening programs or encouraged to access treatment for chronic diseases, so they are waiting until advanced stage of disease. So, as compared to countries from the Western of Europe, such as Germany, if we take into consideration the low level of prophylaxis, the few health policies, the high prevalence of obesity of 31.9% and

diabetes mellitus of 11.6% as reported by the Predator study, there is a high need for working on public health policies and on sustainably financing such regulation in order to address the population to realize the faced problems and to realize the importance of changed in behavior and lifestyle before it's too late and the health burden will be too high for the public service (27,28).

In a similar study from Poland, made by Górnicka et al., similar results were reported, such as the impact of COVID-19 also decreased the amount of physical activity of the respondents, increased the time spent in front of a screen, while for food intake, there were two different patterns – pro-healthy and unhealthy, respectively, the first one was composed of individuals that declared moderate to high amount of physical activity, an increased intake of water, fruits, vegetables, fish and whole grains as homemade meals, while the latter were reducing their physical activity amount, homemade meals or increased the screen time and were, preponderant, not working, from a higher gross domestic product region, living with partner and/or children. The possible explanation for limiting physical activity are connected to home confinement and general restrictions, that, further, lead to inactivity and a worse coping with stress and isolation in case of isolation. Another important aspect to emphasize is the association between physical inactivity an overweight an obesity, a critical risk if we think about public health, especially if we take into consideration the association with consumption of more unhealthy foods and sedentary behaviors such as more time spent in front of a screen (29).

The importance of facing and tackling with this public health issues is the sustainably development of the region, because the neighbor countries such as Moldova, Bulgaria, Serbia etc. could benefit from our example and learn how to implement similar models, adapted to the local characteristics.

The stressful aspect of this pandemic period has impacted even the pediatric population, fact revealed by their higher frequency of snacks intake, leading to a higher prevalence of nutrient deficiencies and obesity in children and important initiating and developing policies for stimulating families to change their alimentary behaviors (30,31). Even if the present study didn't evaluate the weight gain, data from literature reported that the general population gain weight during pandemic period and this modification is secondary to the stress level increase, that lead to alterations in lifestyle, a higher belly fat and a reduced lean muscle mass, sleep duration and a lesser coffee consumed; for example, in England a median of approximately 3 kg weight gain in more than 40% of the adult population was recorded (32-34).

A study by Enriquez-Martinez et al. (35) reported that in Ibero-American countries COVID-19 pandemic modified their lifestyle resulting in an increase in the anxiety level, leading to an increase of compulsive snacking as in our cohort; the Brazilian ate more fast-food and spent a longer time in front of screens and assigned lower time for physical activities, while Grant et al. reported that Italian population ate more small meals, comfort foods and undergone less physical activity, but they also increased the intake of fruits and vegetables (36).

Another important aspect that was modified by pandemic period was the increased level of anxiety, that lead to the sleep patterns alteration, affecting all age groups, phenomenon that received a specific name of coronasomnia, that includes sleep disruption, even insomnia, poorer quality of sleep and a higher need for sleeping (37,38).

The second direction noted is that of potentially negative choices about eating habits, which can be interpreted as risky behaviors. The reported dietary changes were reflected both positively through more regular meals pattern, slightly increased in the intake of fruits and vegetables, lower consumption of fast food and higher cooked food, and negatively through a higher intake of sweets and increased the habit of nibbling on stress. Here we find two issues that reported higher levels: the consumption of chocolate, candy and sweets and the habit change of eating stress bites. Excessive consumption of sweets and stress bites was also found in the study conducted by Pérez-Rodrigo et al., where the people consuming sweets and stress bites were defined in a separate group (39). The pattern of people who were included in this group was defined by: activity similar to the prepandemic period, with poorer sleep quality and a majority of individuals aged  $\geq 55$  years. We also found a higher amount of consumption of these products in a study developed by Górnicka et al., where the unhealthy group shows an 80% increase in consumption, and, in the cohort, 1/3 of the participants consumed sweets daily (29). Giacalone et al. also showed an increase in confectionery, of which commercial by 21% and homemade by 38.1% (40). Compulsive stress eating, the second variable included in this direction, also had a 45% increase in this paper. All these maladaptive changes are consistent with an increment of the general population prevalence of obesity and non-communicable disease, leading to a long-term burden for the healthcare systems.

## CONCLUSIONS

The COVID-19 pandemic was first and foremost a challenge especially for infectious disease and public health professionals. By degrees, the change

in lifestyle that originates in the pandemic period determined a series of adaptive and, respectively, maladaptive behaviors that redefined each person's lifestyle. The feature that easily weighed on all the activities of this period is the perceived level of stress and anxiety, which is also increased. Through the correlation between anxiety and lifestyle choices in the pandemic period, a statistically significant association was established between compulsive eating and sleeps quality. An important negative aspect is the increased in the prevalence of obesity, of non-transmittable diseases and sedentary behavior, starting from the pediatric population age group, fact that will have a negative impact on the healthcare system on a long-term perspective.

To sum up, we should continue with educational policies in order, on one hand, to improve what negatively modified during the pandemic period,

and on the other hand, to benefit from the positive aspects such as a healthier lifestyle, with a diet consisting of nutritional dense food, without fast-food, sweets and higher amounts of physical activities.

Taking into account these preliminary data, we consider that it is necessary to create multidisciplinary teams, composed of infectionists, family doctors, diabetologists, nutritionists and psychologists, to assess the postCOVID patient as a whole, but also healthy people who, although not through the disease, it is under the influence of COVID-19, at least from the perspective of a radical change of lifestyle. These lifestyle changes will also have important consequences for pathological entities in the near future, which all clinicians must take into account when evaluating their patients.

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