LOCKDOWN INFLUENCE ON DIET AND PHYSICAL ACTIVITY OF SENIORS; HAS IT WEIGHT CONSEQUENCES?

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SUMMARY

Objectives: Many studies draw attention to the negative consequences of the pandemic or lockdown on the well-being and lifestyle of different sections of the population. This study considers whether changes occurred in dietary regime and level of physical activity during three periods – before the pandemic, during the lockdown, and during the present in older Slovak adults. We also investigate whether individual weights changed during the pandemic.

Methods: The study has a cross-sectional design. We collected 436 questionnaires from older adults (60+) living in Slovakia; 277 come from the first phase of online data collection (04/2022–06/2022) in university students of the third age, and 159 from the second phase of offline collection (07/2022–11/2022) in social service facilities. We monitored if there were any changes within the observed periods in the variables of diet regime, physical activity, and BMI. The database has been processed in IBM SPSS Statistics.

Results: During the lockdown, the frequency of physical activity decreased ($p < 0.001$), the quality of movement worsened ($p < 0.001$), and the time respondents devoted to physical activity during the week decreased ($p < 0.001$). At present, the variables have increased. Within the dietary regimen, statistically significant changes occurred in appetite and non-alcoholic beverage intake ($p = 0.002$). However, there were no significant changes in the number of daily meals ($p = 0.190$), or the amount of alcohol consumed ($p = 0.066$). The BMI of older men and women did not change after the pandemic ($p = 0.519$), and it did not differ between men and women either before the pandemic ($p = 0.281$) or after it ($p = 0.449$). Also there is no difference between UTA students and social facility living seniors before the pandemic (0.933) and now (0.317). The results showed that even though physical activity significantly decreased during the lockdown, the older adults in our study did not eat more during the lockdown, nor did they gain weight. However, this probably had negative consequences for the quality of their movement.

Conclusion: It is essential to simultaneously create compensatory measures while implementing future anti-epidemic (or other) measures. They would help maintain the desired amount of physical activity or other healthy habits on an optimal level.

Key words: BMI, COVID-19, nutrition, physical activity, older adults

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INTRODUCTION

The number of people aged 60 and older in the population is increasing. Already in 2019, their number exceeded 1 billion and will probably double by 2050. These globally changing demographics require the adaptation of different indices – for example, health and social care, transport, housing, and urban planning. The goal should be a more acceptable world for older people, which will meet their needs and maintain a desirable quality of life. The environment in which individuals exist affects their behaviour exposing them to risks, but can also provide access to health services and the opportunities that aging brings (1).

From a biological point of view, aging is the result of the accumulation of damage at various levels of the organism over time. This inevitably leads to a decrease in physical and mental capacity and a greater risk of illness and death. These changes are not linear and are only partially related to the person's age. In addition to biological changes, aging is also affected by other life changes such as moving, retirement, and the death of friends and partners. Therefore, the elderly are not a consistent group. Some 80-year-olds may be more vital than 60-year-olds. A comprehensive public health response must consider this wide range of experiences and the needs of older people. However, the diversity seen in older age groups is not accidental. Much of it comes from people's social environment and the impact of that environment on opportunities and health behaviours. The relationship we have with our environment is distorted by the conditions, the personal characteristics (family) into which we are born, our gender, and ethnicity, which lead to health inequalities (2).

COVID-19 has changed the daily routine of seniors, but also the care and support that many depend on. Causal treatment and vaccines have not yet been available against COVID-19. There-

fore, the emphasis was placed on preventive measures, such as hand hygiene, wearing masks/respirators, and social distancing (quarantine, lockdown). Older people in particular have been instructed to spend more time at home without physical contact with other people (1, 3). This had consequences for people's mental health and well-being. Older adults of retirement age were especially concerned about the loss of social activities and freedom. It is important to create conditions to support healthy aging during crises (4).

Some older people have had the opportunity to use the pandemic to increase physical activity and improve their condition, but for many, their health has deteriorated due to isolation and fewer opportunities for socialization and physical activity. Confinement at home for a long period caused reduced mobility, poorer condition, muscle weakness, and joint pain. Previously independent elderly people have become dependent on walking aids. Reduced mobility has a domino effect, which is why some older people have gained weight and experienced muscle and joint pain (5). In combination with reduced physical activity, an increased caloric intake (by increasing the number of daily meals) may have occurred, the result of which could be an increase in weight, which may have other negative consequences for senior's health. Several studies have found that lifestyle and opportunities for physical activity have been affected in a group of teenagers and young people (6–8), but we want to look at whether there was a change because of the pandemic in the senior population as well.

MATERIALS AND METHODS

Setting and Subjects

The study has a cross-sectional design. The research was administered in two phases. The first phase of data collection was realized from April to June 2022 in the form of online questionnaires through the Association of Universities of the Third Age (UTA), who represent seniors living at home (277). The second phase took place in social facilities in and around Košice, Slovakia, and in a leisure centre for seniors in period from July to November 2022 (159). Our target group was seniors aged 60 and over without cognitive impairments. Construction of the questionnaire and data collection took place as part of the trilateral project AURORA: Active aging – healthy lifestyle.

Measurements

The questionnaire was created for the subjective assessment of satisfaction with quality of life and health, social contacts during the pandemic, and lifestyle changes during the pandemic among seniors. In the first part, we focused on the basic demographic data of the respondents (gender, age, education, place of residence, marital status, etc.). As individuals younger than 60 also attended UTA, they were excluded from the sample. The second part belonged to various components of quality of life, health, and lifestyle before the pandemic, during the lockdown, and now. For most of the items, the respondents had to evaluate three different periods (before the pandemic – the period immediately preceding the pandemic, during the lockdown, and currently – at the time of answering the questionnaire) with the available scale: decreased, remained the same, increased. We also asked about respondents' height and weight before the pandemic and now, from which we calculated the body mass index (BMI) before the pandemic and now. We then categorized BMI according to the World Health Organization (WHO) indices (9). We investigated the weight for two periods (before the pandemic, currently) since there may not be a significant change in the BMI category when the weight fluctuates. The results may be slightly skewed due to respondents' willingness to answer consistently on all periods.

Statistical Analysis

The data has been processed in IBM SPSS Statistics. The χ^2 test of independence was used to analyse demographic characteristics in men and women. Pre-pandemic and current BMI values were calculated from the reported height and weight before the pandemic and at present. For the continuous variable BMI level, a paired-samples t-test was used to analyse the differences before the pandemic and now, and independent samples t-test to analyse

Table 1. *Demographic characteristics of senior women and men (N = 436)*

Variables		All n (%)	Women n (%)	Men n (%)	p-value
Age group	60–69	198 (45.4)	157 (46.2)	41 (42.7)	0.339
	70–79	160 (36.7)	119 (35.0)	41 (42.7)	
	80+	78 (17.9)	64 (18.8)	14 (14.6)	
Education	Elementary	35 (8.1)	24 (7.1)	11 (11.7)	0.179
	Secondary	229 (52.8)	186 (54.7)	43 (45.7)	
	University	170 (39.2)	130 (38.2)	40 (42.6)	
Marital status	Single	161 (37.2)	110 (32.4)	51 (54.3)	**< 0.001**
	Coupled	272 (62.8)	229 (67.6)	43 (45.7)	
Place of residence	Home	294 (68.1)	242 (71.4)	52 (55.9)	**0.005**
	Retirement home	138 (31.9)	97 (28.6)	41 (44.1)	
Residence	City	352 (82.8)	275 (82.8)	77 (82.8)	0.994
	Village	73 (17.2)	57 (17.2)	16 (17.2)	

Numbers in bold indicate statistically significant values.

differences based on gender and place of residence. The Friedman test (non-parametric) was used to analyse the differences between periods in the variables of diet and physical activity, in the sample as a whole, due to the use of an ordinal variable. A post-hoc test was Wilcoxon signed rank test used in two subgroups – UTA students and social facility living seniors.

RESULTS

The final dataset consists of 436 seniors aged 60 and older, of which 340 are women (78%) and 96 are men (22%). Descriptive characteristics of the analysed sample can be found in Table 1. In terms of age distribution (range 60–99), the largest part of the sample were respondents in the age category 60–69 years (45.4%), less in the category 70–79 years (36.7%), and the smallest part of the sample consisted of respondents aged 80 + (17.9%). Most of the probands had secondary education (52.8%), then university education (39.2%), only 8.1% had a primary education. Up to 82.8% lived in the city, and 17.2% responded that they lived in the village. In the case of age, education, or place of residence, there were no significant differences between men and women ($p=0.339$, $p=0.066$, $p=0.994$, respectively).

More than two-thirds of respondents (68.1%) lived at home (own residence, rental, living together with children) and less than one-third lived in a facility providing social services (31.9%), which also differed between men and women ($p=0.005$). There was a statistically significant difference between men and women in the case of marital status, where 32.4% of women had a partner (married, partnership), but up to 54.3% of men ($p<0.001$). In total, 37.2% of respondents had a partner, and 62.8% of respondents did not have a partner (single, living separately, divorced, widowed).

The frequency of physical activity, quality of their movement, and the time seniors devoted to physical activity during the week are presented in Table 2. Before the pandemic, up to 77.1% of seniors reported a stable frequency of physical activity, 11.2% reported an increase, and 11.7% a decrease already in the pre-pandemic period. During the lockdown, this ratio changed, and the part of respondents whose PA frequency remained stable dropped to 40.3%. The part of probands who reported an increase in frequency during the lockdown dropped to 6.8% and more than half (52.9%) of probands reported a decrease in frequency. Currently, the portion of seniors whose PA frequency decreased reduced from 52.9% to 24.7%. The increase was reported by 24.4% of respondents (versus 6.8% in the lockdown).

The quality of movement remained the same for 87.6% of men and women before the pandemic, during the lockdown only for 56.6% and currently for 59.9%. During the lockdown, the quality of movement worsened by 40.3% (compared to 6.7% before the pandemic), and currently by 25.9%. The increase was currently 14.2%, during the lockdown only 3.2% and before the pandemic 5.7%.

More than 4 hours of physical activity per week had the largest portion of respondents before the pandemic and now (34.8% or 31.8%). During the lockdown, it was only 21.1%, the same proportion had seniors with PA 1–2 hours per week. A significant change occurred in those who spent less than 30 minutes of physical activity per week. During the lockdown, their proportion almost doubled from 11% (before the pandemic) to 19.9%. Fortunately, the probands in this group have now dropped to 12.6% – almost to the pre-pandemic level. We present the complete results for these variables and their changes in Table 2. Based on them, we conclude that there were statistically significant changes in all three variables ($p<0.001$). This means that during the lockdown, the frequency of physical activity decreased, the quality of movement decreased, and the time devoted to physical activity per week decreased. At the same time, the respondents stated that the frequency of their physical activity has now increased, and the quality of their movement has also improved, but not to the level before the pandemic. The same applies to the time devoted to physical activity.

Table 2. *Physical activity of seniors before the pandemic, during lockdown and at present*

Variables		Before pandemic n (%)	During lockdown n (%)	Present time n (%)	p-value
PA frequency	Decrease	47 (11.7)	219 (52.9)	99 (24.7)	**<0.001**
	Same	309 (77.1)	167 (40.3)	204 (50.9)	
	Increase	45 (11.2)	28 (6.8)	98 (24.4)	
Friedman mean rank		2.18	1.66	2.16	
Movement quality	Decrease	27 (6.7)	166 (40.3)	106 (25.9)	**<0.001**
	Same	354 (87.6)	233 (56.6)	245 (59.9)	
	Increase	23 (5.7)	13 (3.2)	58 (14.2)	
Friedman mean rank		2.20	1.76	2.04	
PA time/week	Less than 30 min	45 (11.0)	81 (19.9)	50 (12.6)	**<0.001**
	30-60 min	44 (10.8)	71 (17.4)	56 (14.1)	
	1-2 hours	62 (15.2)	86 (21.1)	50 (12.6)	
	2-3 hours	56 (13.7)	51 (12.5)	51 (12.9)	
	3-4 hours	59 (14.5)	33 (8.1)	63 (15.9)	
	More than 4 hours	142 (34.8)	86 (21.1)	126 (31.8)	
Friedman mean rank		2.22	1.66	2.12	

PA – physical activity. Numbers in bold indicate statistically significant values.

Table 3 contains variables related to the dietary regime of seniors before the pandemic, during the lockdown, and at present. Up to 93.7% of men and women reported the same amount of daily meals before the pandemic, during the lockdown their share dropped to 77.6%, and currently, it has increased to 83.7%. There was no statistically significant change in the number of daily meals ($p=0.190$) or alcohol consumption for individual periods ($p=0.066$) in the whole sample.

Significant changes occurred in seniors' appetite and non-alcoholic beverage intake during the three periods. According to the Friedman mean rank, there was a slight decrease during the lockdown, but currently, they have increased even above the pre-pandemic level ($p=0.002$). The portion of older adults who consumed less than half a litre of non-alcoholic beverages per day remained unchanged (4.1% to 4.6%). The largest portion before the pandemic, during the lockdown and now was held by respondents drinking 1–2 litres of beverages per day. Those who drunk 2–3 litres a day were 9.9% before the pandemic, during the lockdown it rose to 11.1% and currently to 12%. The share of older adults receiving more than 3 litres of beverages per day also rose very slightly – from 0.5% to 1.2%.

The same appetite was reported by 94.1% of older adults before the pandemic, 76.6% during the lockdown, and 82% at present. In 16.1%, the appetite decreased during the lockdown, and in 7.2% it increased. Currently, only 10.1% reported a decrease in appetite, and 7.9% reported an increase.

Table 4 contains differences between two periods in lifestyle and diet variables among UTA students and social facility living seniors. PA frequency lowed during lockdown among UTA students as well as facility living seniors. After that, at the present time was frequently higher than during lockdown in both subgroups. In comparison between periods before the pandemic and at the present time there was no significant change in both subgroups. The quality of movement significantly worsened in both groups during the lockdown, with a subsequent significant improvement in the present. Between the period before the pandemic and now, there is no difference in the quality of movement of any of the subgroups. The time devoted to PA per week significantly decreased again in both subgroups and has increased in the current period. In the case of seniors living in a social facility, there is also a significant difference between the period before the pandemic and now, so they devote less time to PA than before the pandemic. The appetite was lower during the lockdown only among those who lived in a social facility. But it has now significantly increased for both groups, compared to the period before the pandemic. The number of daily meals decreased during the lockdown, and currently it has increased for seniors in social facilities. For UTA students, there was a reduction in the number of daily meals in the present time compared to the lockdown. During the lockdown, seniors living in a social facility drank less alcohol, but this did not change for UTA students. At present, however, consumption has slightly increased among seniors in social facilities and, on the contrary, it has decreased among UTA students. The amount of fluids intake has increased both during the lockdown and the pre-pandemic period for both subgroups.

Almost half of the respondents were overweight before the pandemic (46.8%), which has not changed much now (44.7%).

Table 3. *Diet of seniors before the pandemic, during lockdown and at present*

Variables		Before pandemic n (%)	During lockdown n (%)	Present time n (%)	p-value
Appetite	Decrease	19 (4.7)	67 (16.1)	42 (10.1)	**0.002**
	Same	384 (94.1)	318 (76.6)	342 (82.0)	
	Increase	5 (1.2)	30 (7.2)	33 (7.9)	
Friedman's mean rank		2.02	1.94	2.04	
Daily meals	Decrease	22 (5.4)	55 (13.3)	46 (11.2)	0.190
	Same	385 (93.7)	322 (77.6)	345 (83.7)	
	Increase	4 (1.0)	38 (9.2)	21 (5.1)	
Friedman's mean rank		2.01	2.02	1.97	
Alcohol consumption	Decrease	46 (12.3)	64 (16.9)	60 (16.0)	0.066
	Same	285 (76.2)	255 (67.5)	264 (70.4)	
	Increase	1 (0.3)	17 (4.5)	8 (2.1)	
	Null	42 (11.2)	42 (11.1)	43 (11.5)	
Friedman's mean rank		2.02	2.01	1.97	
Drinking regimen – non-alcoholic (litres per day)	Less than 0.5	17 (4.1)	19 (4.6)	18 (4.4)	**0.002**
	0.5–1	97 (23.3)	105 (25.3)	86 (21.0)	
	1–2	259 (62.3)	242 (58.3)	252 (61.5)	
	2–3	41 (9.9)	46 (11.1)	49 (12.0)	
	More than 3	2 (0.5)	3 (0.7)	5 (1.2)	
Friedman's mean rank		1.99	1.97	2.05	

Numbers in bold indicate statistically significant values.

Table 4. *Differences between periods in lifestyle and diet variables in university of third age students and social facility living seniors*

Variables	At home seniors (UTA)			Facility living seniors		
	Mean	Z	p-value	Mean	Z	p-value
PA frequency BP/L	2.07 (BP)	–9.113	**< 0.001**	1.78 (BP)	–10.098	**< 0.001**
PA frequency L/PT	1.56 (L)	–9.367	**< 0.001**	1.49 (L)	–7.291	**< 0.001**
PA frequency BP/PT	2.15 (PT)	–1.725	0.085	1.7 (PT)	–1.404	0.160
Movement quality BP/L	2.04 (BP)	–8.701	**< 0.001**	1.85 (BP)	–8.620	**< 0.001**
Movement quality L/PT	1.64 (L)	–6.827	**< 0.001**	1.61 (L)	–6.650	**< 0.001**
Movement quality BP/PT	1.96 (PT)	–1.784	0.074	1.80 (PT)	–1.176	0.240
PA time/week BP/L	4.49 (BP)	–8.279	**< 0.001**	3.19 (BP)	–11.942	**< 0.001**
PA time/week L/PT	3.80 (L)	–8.839	**< 0.001**	2.26 (L)	–8.512	**< 0.001**
PA time/week BP/PT	4.50 (PT)	–0.751	0.453	2.88 (PT)	–5.192	**< 0.001**
Appetite BP/L	1.99 (BP)	–1.112	0.226	1.89 (BP)	–6.261	**< 0.001**
Appetite L/PT	1.96 (L)	–2.063	**0.039**	1.78 (L)	–5.765	**< 0.001**
Appetite BP/PT	2.03 (PT)	–1.265	0.206	1.87 (PT)	–0.519	0.604
Daily meals BP/L	1.98 (BP)	–1.606	0.108	1.89 (BP)	–5.345	**< 0.001**
Daily meals L/PT	2.02 (L)	–3.003	**0.003**	1.81 (L)	–5.515	**< 0.001**
Daily meals BP/PT	1.94 (PT)	–1.401	0.161	1.92 (PT)	–0.124	0.901
Alcohol consumption BP/L	1.92 (BP)	–0.457	0.647	2.60 (BP)	–3.780	**< 0.001**
Alcohol consumption L/PT	1.93 (L)	–2.839	**0.005**	2.54 (L)	–3.300	**0.001**
Alcohol consumption BP/PT	1.87 (PT)	–3.272	**0.001**	2.61 (PT)	0.000	1.000
Drinking regimen (NA) BP/L	2.78 (BP)	–0.180	0.857	2.79 (BP)	–0.485	0.628
Drinking regimen (NA) L/PT	2.77 (L)	–3.053	**0.002**	2.79 (L)	–3.073	**0.002**
Drinking regimen (NA) BP/PT	2.83 (PT)	–2.129	**0.033**	2.85 (PT)	–3.582	**< 0.001**

UTA – university of third age; BP – before pandemic; L – lockdown; PT – present time; NA – non-alcoholic
Numbers in bold indicate statistically significant values.

In terms of gender, 44.2% of women and 56.3% of men were overweight before the pandemic. Currently, 42% of women and 54.7% of men are overweight. The second most numerous BMI category was standard weight before the pandemic (29.0%) and now (31.4%). Before the pandemic, 30.9% of women and only 21.8% of men had standard weight. Currently, the ratio has hardly changed. The portion of women and men with standard weight is 33% and 25.6%, respectively. There are 19.2% of women and 16.1% of men in the obesity class I category. After the pandemic, the share among women remained unchanged (19.2%), while among males it decreased (12.8%). The proportion of individuals with obesity class II was 3.3%, and it decreased to 3% after the pandemic (one person less). In the obesity class III category, we find, before and after the pandemic, 6 women (1.9%) and no men (0%). The number of underweight probands did not change. Even though there were changes in the weight of the participants in our study – the proportion of participants who were overweight decreased slightly, and the proportion of those with a normal weight increased or participants lost weight. However, BMI categorization was not statistically significantly different for women and men before the pandemic ($p = 0.281$) or now ($p = 0.449$), and not statistically significant for UTA students and social facility living seniors before the pandemic (0.933) and now (0.317). There was also no statistically significant change in BMI compared to the period before the pandemic ($p = 0.519$) (Table 5).

Our results showed that although physical activity significantly decreased during the lockdown, the older adults in our study did not eat more during the lockdown, nor did they gain weight. However, this may have negative consequences for the quality of their movement.

DISCUSSION

In many countries, anti-epidemic measures meant the cancellation of leisure activities, including group exercises for seniors. Isolation indeed had a positive effect on reducing the spread of infection, but a negative effect on physical activity. When a person is confined at home, s/he has limited movement, which can lead to excessive physical inactivity. Some seniors who do not exercise enough can lose muscle mass, flexibility, and aerobic capacity. This, in turn, can accelerate seniors' frailty and dependence on care and health services (10).

Table 5. *Nutritional status of respondents (based on BMI levels) before the pandemic and at present*

BMI classification	BMI before the pandemic			BMI at the present		
	Women n (%)	**Men n (%)**	**All n (%)**	**Women n (%)**	**Men n (%)**	**All n (%)**
Underweight	4 (1.3)	1 (1.1)	5 (1.2)	4 (1.3)	1 (1.2)	5 (1.3)
Normal weight	98 (30.9)	19 (21.8)	117 (29.0)	103 (33.0)	22 (25.6)	125 (31.4)
Overweight	140 (44.2)	49 (56.3)	189 (46.8)	131 (42.0)	47 (54.7)	178 (44.7)
Obesity class I	61 (19.2)	14 (16.1)	75 (18.6)	60 (19.2)	11 (12.8)	71 (17.8)
Obesity class II	8 (2.5)	4 (4.6)	12 (3.0)	8 (2.6)	5 (5.8)	13 (3.3)
Obesity class III	6 (1.9)	0 (0.0)	6 (1.5)	6 (1.9)	0 (0.0)	6 (1.5)
Total	317 (100)	87 (100)	404 (100)	312 (100)	86 (100)	398 (100)
IS t-test p-value	0.281		–	0.449		–
	UTA n (%)	**SF n (%)**	**All n (%)**	**UTA n (%)**	**SF n (%)**	**All n (%)**
Underweight	3 (1.1)	2 (1.6)	5 (1.3)	3 (1.1)	2 (1.7)	5 (1.3)
Normal weight	74 (27.0)	43 (34.1)	117 (29.3)	76 (27.7)	49 (40.8)	125 (31.7)
Overweight	134 (48.9)	51 (40.5)	185 (46.3)	132 (48.2)	42 (35.0)	174 (44.2)
Obesity class I	52 (19.0)	23 (18.3)	75 (18.8)	51 (18.6)	20 (16.7)	71 (18.0)
Obesity class II	8 (2.9)	4 (3.2)	12 (3.0)	9 (3.3)	4 (3.3)	13 (3.3)
Obesity class III	3 (1.1)	3 (2.4)	6 (1.5)	3 (1.1)	3 (2.5)	6 (1.5)
Total	274 (100)	126 (100)	400 (100)	274 (100)	120 (100)	394 (100)
IS t-test p-value		0.933	–	0.317		–
PS t-test p-value	0.519					

IS t-test – independent samples t-test; PS t-test – paired-samples t-test; SF – social facility seniors; UTA – university of the third age; underweight – below 18.5; normal weight – 18.5–24.9; overweight – 25.0–29.9; obesity class I – 30.0–34.9; obesity class II – 35.0–39.9; obesity class III – above 40 (9 – WHO classification)
Numbers in bold indicate statistically significant values.

In the survey by Vajda et al. (11), up to 89% of older adults aged 65+ performed physical activity two or more times per week, and 40% up to four or more times per week in the pre-pandemic period; 61% of respondents reported that they could not replace the time spent exercising in the currently closed facilities with some other equally intense sports activity (11).

Therefore, when planning future anti-epidemic measures, it is necessary to propose alternative activities to maintain the necessary level of physical activity to avoid a functional decline. For example, one study created a home version of a functional workout video for every day of the week. This was not time-consuming, lasting about 10 minutes. Even in this way, it is possible to maintain optimal health during active aging (10).

In a survey by Alcântara et al. (12), maintaining physical activity among seniors during the pandemic was associated with lower levels of perceived stress compared to individuals who did not follow physical activity recommendations either before or during the pandemic. In our study, we did not measure the perceived stress of the respondents, since there was a statistically significant decrease in physical activity in our sample, we do not dismiss (but also do not confirm) that this could have had this effect.

Moreover, older people who engage in at least 2 hours of physical activity per week have a significantly lower prevalence of hypertension, obesity, and cardiovascular disease than those who engage in less physical activity (13). Regular physical activity can be a useful tool in preventing a decrease in the well-being of older people affected by isolation caused by a pandemic or other crisis. In a study by Szychowska et al. (13), over 65% of respondents reported engaging in PA for less than 1 hour per week or less. It was the opposite for our respondents, 63% engaged in physical activity 2 hours or more before the pandemic, during the lockdown it dropped to 41.7%, but now it has increased again to 60.6% of older people; 21.8% of older adults spent less than 1 hour a week doing physical activity before the pandemic, during the lockdown it increased to 37.3%, and at present it is 26.7%.

Even if the elderly should stay at home to protect themselves from the coronavirus, they must avoid a sedentary lifestyle. Physical activity allows them to remain independent, as well as maintain mental health and well-being. In older age, maintaining mobility is essential because it can predict the need for nursing care in the future (14). Physical activity is also related to the maintenance of a suitable weight, the increase of which (excess reduction) can have health (obesity, diabetes mellitus, CVD, chronic inflammation) and other consequences (reduced mobility and the need for care).

Social isolation during the lockdown may have also put seniors at increased nutritional risk, for example, due to socioeconomic insecurity that may have affected food acquisition. In addition, aging itself causes changes in nutritional needs and eating habits (15). Appetite could also decrease as a result of the stress situation. This was confirmed in our sample – the appetite of probands decreased. Despite this, the number of daily meals of our respondents did not change significantly. However, nutritionists could provide remote nutritional monitoring if needed (15).

Social distancing during the pandemic probably also caused an increase in alcohol-related disorders. The prevalence of alcohol-related liver and GIT disease increased during the pandemic. This increase may have been due to an increase in alcohol consumption due to the stress of social isolation. However, the study was not solely focused on the older adult population (16). Fortunately, there was no significant increase in alcohol consumption among our respondents during the pandemic (lockdown).

Alcohol consumption is also associated with a higher BMI and a higher waist circumference (17), so we also asked our respondents if their alcohol consumption increased during the pandemic, but the results were not statistically significant and only a small number of respondents changed their alcohol consumption habits.

Before the pandemic, 46.8% were overweight, and currently it is 44.7%. The number of underweight people did not change, but 23.1% had obesity (grades I-III) before the pandemic, and 22.6% now, which means that there was even weight loss in our sample.

We take into account that evaluating obesity solely based on BMI is not a correct procedure, we consider our categorizations only as rough estimates. As for an active lifestyle, the health status of older adults should be taken into account, particularly, whether their status allows them some type of physical activity, and whether they are taking, for example, medications that could cause weight gain.

Before the pandemic, 29% of individuals were included into the normal weight category, currently, it is 31.4% (but the difference is not statistically significant). At the same time, the share of people performing physical activity for more than 4 hours a week decreased by almost 40% during the lockdown, and the share of people who devoted less than 30 minutes to physical activity a week increased almost twice (from 11% to 19.9%).

Overweight (BMI >25) and obesity (BMI >30) increase the risk of obesity-related comorbidities and increase morbidity and mortality. In addition, they have a higher risk of metabolic syndrome, which in turn leads to a risk of cardiovascular disease and type 2 diabetes. Various pathophysiological conditions can be behind the aetiology of obesity, but modifiable lifestyle factors such as a sedentary lifestyle and high-calorie intake are often the cause (18). Obesity is associated with a higher risk of death from COVID-19 (19).

A certain part of the adult population gained weight during quarantine after only two months. Risk factors are reduced physical activity and, conversely, increased sedentary behaviour, increased frequency of snacking (especially after dinner), increased alcohol intake, reduced water intake, emotional eating, and reduced sleep quality (20). In our study, there was slight, but significant change in the number of daily meals in UTA students and social facility living seniors. Alcohol consumption decreased in social facility living seniors during lockdown, and in UTA students decreased even in present time compared to pre-pandemic level. Non-alcoholic beverages intake remained the same or gets higher.

Another study comparing community-dwelling seniors and nursing home residents found that they did not differ in strength, flexibility and BMI, but do differ in aerobic endurance, balance and agility in favour of nursing home residents (21).

In addition, obese individuals have greater postural sway than normal-weight individuals, meaning they are less stable, and thus obesity contributes to balance problems and may be a predictor of increased fall risk. It is also a strong risk factor for osteoarthritis of the knee joint, especially in women. Losing 5.1 kg of body weight over ten years can reduce the likelihood of knee osteoarthritis by up to 50% (22). There are countless reasons for maintaining optimal physical activity throughout life, but also in older age.

Aging itself is associated with a decline in immune function, including cytokine dysregulation and increased inflammation. This low-grade chronic inflammation plays an important role in the development of atherosclerosis, diabetes mellitus, and other chronic diseases associated with aging, which have a high prevalence in the elderly and are a major cause of disability. Age-related sarcopenia and loss of muscle strength contribute to the deterioration of physical function. Adipose tissue is a major producer of inflammatory factors, and obesity can exacerbate a decline in physical function through increased production of catabolic inflammatory cytokines that induce skeletal muscle atrophy. Muscle loss and excess adiposity (overweight or obesity) act synergistically to increase the risk of frailty and disability in older adults. Physical activity, on the other hand, suppresses muscle catabolism, reduces inflammation, and can thus delay the onset of immunosenescence (aging of the immune system) (23).

Limitations of the Study

The main limitation of the study is the cross-sectional design, which could have distorted the statements of the respondents due to the need for retrospective reflection on the period before the pandemic and during the lockdown. Subjective evaluation using questionnaires and the unrepresentativeness of the sample (most of respondents are women) are also limitations. Some of the respondents did not consistently answer in all three periods. We also did not ask whether the respondents had changed the way they eat in terms of the composition of their diet, or the specific type of physical activity that our respondents engaged in. Another limitation concerns the consideration of weight since we do not have information about individuals' medication. Also, evaluation of body weight and height by respondents, from which we calculate BMI was subjective.

CONCLUSIONS

Lifestyle factors have an undeniable impact on the health and quality of life of people, including the elderly. The pandemic and related measures significantly affected these areas. Understandably, this manifested itself in an inability to maintain healthy habits, especially a sufficient amount of physical activity. In addition, the quality of movement of older adults has also deteriorated. A healthy lifestyle involves not drinking alcohol, consuming a regular, varied diet and health-adequate exercise; these are key to maintaining good health at any age. Preventive and corrective measures are necessary if we want to maintain good health and ensure the quality of life for individual population groups, especially older adults who, although they would survive the pandemic without getting infected, could remain dependent on nursing care. Measures may include education about healthy nutrition, online exercise videos, or at least motivation to stretch regularly, which has the potential to preserve mobility. These can be implemented in community-dwelling seniors as well as in social facility living seniors.

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Conflicts of Interest

None declared

Adherence to Ethical Standards

The Ethics Committee of the Faculty of Health Sciences of the Palacký University in Olomouc, Czech Republic, and the Ethics Committee of the Pavol Jozef Šafárik University in Košice, Slovak Republic, approved the study.

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