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Impact of COVID-19 pandemic on health-promoting lifestyle behaviors: A cross-sectional study

Çiğdem Samancı Tekin[1]✉, Züleyha Kılıç[2]

[1]Niğde Ömer Halisdemir University, Faculty of Medicine, Internal Medical Sciences, Department of Public Health, Niğde, Turkey

[2]Niğde Ömer Halisdemir University, Faculty of Health Sciences, Department of Internal Diseases Nursing, Niğde, Turkey

ABSTRACT

Objective: To explore health-improving behaviors during COVID-19 pandemic and to reveal the impact of the risk perception of COVID-19 on these behaviors.

Methods: We recruited a total of 510 participants for this cross-sectional study. The data were collected online using a questionnaire booklet covering a form inquiring about the participants' demographic, physical, and mental characteristics, the Generalized Anxiety Disorder-7 Scale, and the COVID-19 Perceived Risk Scale.

Results: The mean age of the participants was (28.7±10.1) years, and 76.1% were females. Of the participants, 31.8% were overweight and obese. While 35.1% experienced negative alterations in their dietary patterns, 23.9% reported positive changes to their diet during the pandemic. Besides, 47.8% reported their sleep to be negatively affected during the pandemic. While the rate of those with extended screen time was 72.5%, it was 44.3% for the participants engaging in regular exercise. More than one-third of the participants (35.9%) had high and severe anxiety. We also found increased risk perception of COVID-19 among females, obese, those with disturbed eating and sleep quality, healthcare workers, and those with severe anxiety.

Conclusions: Overall, the pandemic has appeared to have brought both positive and negative impacts on maintaining and improving eating, sleep, physical activity, and mental health.

KEYWORDS: Health promotion; Public health; COVID-19; Generalized Anxiety Disorder-7 Scale; Perceived Risk Scale; Mental health; Physical activity

1. Introduction

The World Health Organization declared the COVID-19 pandemic a public health emergency on January 30, 2020[1]. Currently, the total number of cases in Turkey has exceeded 17 million[2]. Personal protective measures have always been the focal point of health-protective studies during the pandemic. In this regard, risk perception can be considered essential in the public's willingness to engage in health-protective behaviors since risk perception can affect one's behaviors in new and unpredictable diseases such as COVID-19. The perception of the risk of being infected with a disease with severe consequences then becomes a factor facilitating adaptation to the new situation and compliance with the rules enforced against the disease[3]. Interestingly, while the focus has been directed on personal protective measures during the pandemic, planned health promotion activities have remained in the shadows. Yet, it should be noted that chronic diseases have occupied the top of the mortality list all over the world in this extraordinary period[4]. In this sense, the impacts of health-promoting life behaviors should not be underestimated in the prevention and effective management of chronic diseases. Regular eating, sleep, and physical activity are

Significance

Preventive measures come to the forefront in a pandemic. The pandemic brings both positive and negative impacts on maintaining and improving eating, sleep, physical activity, and mental health based on one's risk perceptions. Therefore, health-promoting behaviors should be adopted in future epidemics.

✉To whom correspondence may be addressed. E-mail: cigdemstekin@hotmail.com

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considered healthy lifestyle behaviors to improve both physical and mental health, and enabling people to increase control over their health is central to health promotion. Therefore, health promotion is paradoxically more critical than ever in this time of crisis, and one should see the pandemic as a time of opportunity to improve their health[5]. However, the major pandemic-led alterations have adversely affected people's healthy lifestyles[6]. Furthermore, the persistent changing and uncertain situations with the pandemic have exacerbated common anxiety, fear, and stress[7]. We carried out this study to explore health-improving behaviors during the pandemic and to reveal the impact of the risk perception of COVID-19 on these behaviors.

2. Patients and methods

2.1. Study design and setting

The population of this cross-sectional research consists of people aged 18 years and over living in Turkey. We collected the research data online due to the physical distance measures mandated by the government during the pandemic. Upon the snowball sampling technique, potential participants were sent the link generated for the questionnaire booklet *via* social media and E-mail and encouraged to forward it to others. We obtained informed consent from all participants. Overall, the data were collected from a total of 510 people between June 1-June 8, 2021.

2.2. Ethical considerations

The Non-Interventional Clinical Research Ethics Committee of Nigde Omer Halisdemir University granted ethical approval to our study (Protocol No: 2021/49). Moreover, we presented an informed consent section to potential participants on the top page of the questionnaire booklet, and only those providing their consent to participate in the study were able to continue with the questionnaire.

2.3. Data collection

We collected the data using the Generalized Anxiety Disorder-7 (GAD-7) Scale, the COVID-19 Perceived Risk Scale (CPRS), and a 41-question survey inquiring about the participants' sociodemographic and COVID-19-related characteristics and changes to their lifestyle during the pandemic.

2.3.1. GAD–7 scale

Developed by Spitzer *et al*. based on DSM-IV-TR criteria, the GAD-7 is a short, self-report measure assessing generalized anxiety disorder[8]. It was adapted into Turkish by Konkan *et al.* in 2013. The items of anxiety-related experiences in the last two weeks are responded to on a four-point Likert-type scale ranging from 0 (never) to 3 (almost every day). The cut-off scores on the scale were determined to be 5 for mild anxiety, 10 for moderate anxiety, and 15 for severe anxiety. It is considered important to explore and confirm the diagnosis of GAD with other methods in those with a total GAD-7 score of 10 or more. While the original study reported the instrument's internal consistency reliability (Cronbach's alpha) to be 0.852[9], we calculated it to be 0.907 in our study.

2.3.2. CPRS

Yıldırım and Güler[3] designed the CPRS by adapting the 8-item SARS Risk Perception Scale developed by Brug *et al*. in 2004[10]. The items on this 5-point Likert-type scale are rated between 1 (far probability) and 5 (high probability), and higher scores indicate increased risk perception of COVID-19. We calculated Cronbach's alpha value of the tool to be 0.829.

2.4. Statistical analysis

According to the 2020 data from the Turkish Statistical Institute, the population aged 18 years and over living in Turkey was 60 287 373. Accordingly, we calculated the sample size using the OpenEpi Version 3 Program based on unknown prevalence to be 385 at 50% prevalence and 95% confidence interval (*CI*) (Results from OpenEpi, Version 3, open-source calculator-SSProporwww.OpenEpi.com, accessed 2021/04/01).

Table 1. Participants' demographic characteristics (n=510).

Variables	*n*	%
Sex		
Female	388	76.1
Male	122	23.9
Marital status		
Married	195	38.2
Single	315	61.8
Child status		
Yes	187	36.7
No	323	63.3
Place of residence		
City	363	71.2
District	110	21.6
Town	8	1.6
Village	29	5.7
Educational attainment		
Primary school	24	4.7
High school	56	11.0
Undergraduate	379	74.3
Postgraduate	51	10.0
Vocational healthcare education		
Yes	267	52.4
No	243	47.6
Healthcare professional		
Yes	77	15.1
No	433	84.9
Chronic disease status		
Yes	72	14.1
No	438	85.9
Employment		
Yes	210	41.2
No	300	58.8

Table 2. Participants' physical and nutrition-related characteristics.

Variables	*n*	%
Body mass index (*n*=469)		
Weak (<18.50)	58	12.4
Normal (18.50-24.99)	262	55.9
Pre-obese (25.00-29.99)	119	25.3
Obese (>30.00)	30	6.4
Satisfaction with weight (*n*=510)		
Yes	211	44.1
No	299	55.9
Reason for dissatisfaction with weight (*n*=299)		
I want to lose weight	255	85.3
I want to gain weight	44	14.7
Dietary regime (*n*=510)		
To lose weight	79	15.5
To gain weight	6	1.2
None	425	83.3
Changes to dietary patterns during the pandemic (*n*=510)		
Negative changes	179	35.1
Positive changes	122	23.9
None	209	41.0
Reason for changes to dietary patterns during the pandemic (*n*=510)		
Spending longer time at home	229	45.0
Longer screen time	370	72.5
Having to prepare the meal at home	158	31.0
Increased consumption of cakes, pastries, *etc*	149	29.2
Increased consumption of junk foods	134	26.3
Increased consumption of vegetables and fruits	110	21.6
Decreased consumption of fast food	103	20.2
Increased consumption of fast food	67	13.1
Skipping meals	63	12.4
Decreased consumption of junk foods	56	11.0
Moving to the family home	50	9.8
Starting regular meals	41	8.0
Non-availability of cafes and restaurants	37	7.3
Changes to weight during the pandemic (*n*=510)		
Weight gain	239	46.9
Weight loss	92	18.0
No change	179	35.1
Water consumption (*n*=510)		
Less than 8 glasses a day	298	58.4
8 glasses and above a day	212	41.6
Most consumed drink(s) other than water (*n*=408)		
Tea	297	58.2
Coffee	75	14.7
Milk/butter	36	7.1
Smoking (*n*=510)		
Yes	110	21.6
No	400	78.4
Reduced smoking during the pandemic	16	14.5
Increased smoking during the pandemic	14	12.7
Who started smoking during the pandemic	5	4.5
Alcohol (*n*=510)		
Yes	66	12.9
No	444	87.1

All analyses were performed on SPSS 21.0. The data were presented as mean±standard deviation or percentage (%). Data were initially examined for outliers and normality. Results of boxplots indicated the absence of outliers, and values of skew and kurtosis were found to be within normal limits –1.5 < skew < +1.5 and –1.5 < kurtosis < +1.5[11]. Independent samples *t*-test was used for pairwise comparisons and one-way analysis of variance (ANOVA) followed by *post-hoc* tests (Bonferonni) was used for multiple group comparison. The categorical data were analyzed by using a chi-square test. A *P*-value < 0.05 was considered statistically significant.

3. Results

The mean age of the participants was (28.7±10.1) years, and 76.1% were females. Among the participants, 71.2% lived in the city center, and 84.3% held undergraduate and postgraduate degrees. While 38.2% of the participants were married, 36.7% had children. Moreover, 41.2% were employed, and 15.1% worked as healthcare professionals. About half of them (52.4%) received vocational healthcare education, and 14.1% suffered from a chronic disease (Table 1).

3.1. Participants' physical and nutrition-related characteristics

Among 469 participants reporting their heights and weights, 12.4% were underweight, 25.3% were pre-obese, and 6.4% were obese. While 35.1% reported negative changes to their dietary patterns during the pandemic, the rate of those with positive changes to their diet was 23.9%. The primary reasons for mentioned changes to the participants' eating habits were extended time at home (45.0%) and in front of the screen (31.6%) and having to prepare meals at home (31.0%). In this period, 46.9% of the participants reported gaining weight, and this rate was found to be 73.2% among those experiencing adverse changes to their diets during the pandemic (χ^2=105.983, *df*=4, *P*<0.001). The rate of those losing weight during the pandemic was 18.0%. Of participants who were not content with their weight, 85.3% wanted to lose weight, and 14.7% wanted to gain weight. Moreover, 15.5% followed a dietary regime to lose weight. Besides, 41.6% consumed eight glasses of water or more per day. Turkish tea was the most consumed drink other than water (58.2%). Among smokers (21.6%), 16 participants reduced (14.5%) and 14 increased (12.7%) smoking during the pandemic. In addition, 5 started smoking during the pandemic. Finally, 12.9% reported alcohol use (Table 2).

Table 3. Sleep quality by different variables (*n*, %).

Variables	Negative change (*n*=244)	Positive change (*n*=29)	No change (*n*=237)
Dietary habits			
Negative change (*n*=179)	113(46.3)	6(20.7)	60(25.3)
Positive change (*n*=122)	52(21.3)	17(58.6)	53(22.4)
No change (*n*=209)	79(32.4)	6(20.7)	124(52.3)
Weight change			
Weight gain (*n*=239)	127(52.0)	18(62.1)	94(39.7)
Weight loss (*n*=92)	49(20.1)	5(17.2)	38(16.0)
No change (*n*=179)	68(27.9)	6(20.7)	105(44.3)

Table 4. Sleep time of participants with different weight change (*n*, %).

Weight change	Sleep less (*n*=118)	Sleep more (*n*=175)	No change (*n*=217)
Weight gain (*n*=239)	56(47.5)	101(57.7)	82(37.8)
Weight loss (*n*=92)	30(25.4)	32(18.3)	30(13.8)
No change (*n*=179)	32(27.1)	42(24.0)	105(48.4)

3.2. Participants' sleep characteristics

About half of the participants (47.8%) reported negative changes to their sleep patterns during the pandemic, but the case was vice versa for 5.7%. Approximately one-fourth of the participants (23.1%) slept less, and 34.3% started to sleep longer. The pandemic brought negative changes to the sleep quality of 63.1% of those experiencing negative changes to their dietary habits, showing a significant relationship between sleep quality and dietary habits. (χ^2=47.207, *df*=4, *P*<0.001) (Table 3). We also found a significant relationship between sleep quality and weight change (χ^2=17.627, *df*=4, *P*<0.05). Furthermore, changes in sleep time were significantly related to weight change during the pandemic (χ^2=33.129, *df*=4, *P*<0.001) (Table 4).

3.3. Participants' physical activity status

The majority of the participants (72.5%) reported longer screen time during the pandemic. While 43.7% spent 5 hours or more in front of the screen, this rate was found to be 35.1% on weekends. We discovered a significant association between educational attainment and screen time. The participants holding undergraduate and postgraduate degrees reported longer screen time compared to those with high school and less education (χ^2=21.623, *df*=2, *P*<0.05).

Table 5. Screen time by different variables (*n*, %).

Variables	Longer (*n*=370)	No change (*n*=119)	Shorter (*n*=21)
Educational attainment			
High school and less education (*n*=80)	41(11.1)	33(27.7)	6(28.6)
Undergraduate and Postgraduate (*n*=430)	329(88.9)	86(72.3)	15(71.4)
Marital status			
Married (*n*=195)	119(32.2)	11(52.4)	65(54.6)
Single (*n*=315)	251(67.8)	10(47.6)	54(45.4)
Child status			
Yes (*n*=187)	115(31.1)	12(57.1)	60(50.4)
No (*n*=323)	255(68.9)	9(42.9)	59(49.6)
Dietary habits			
Negative change (*n*=179)	150(40.5)	20(16.8)	9(42.9)
Positive change (*n*=122)	96(25.9)	17(14.3)	9(42.9)
No change (*n*=209)	124(33.5)	82(68.9)	3(14.3)
Weight change			
Weight gain (*n*=239)	193(52.2)	34(28.6)	12(57.1)
Weight loss (*n*=92)	64(17.3)	22(18.5)	6(28.6)
No change (*n*=179)	113(30.5)	63(52.9)	3(14.3)

Table 6. Participants' physical activity status.

Variables	*n*	%
Doing exercise (*n*=510)		
Yes	246	48.2
No	264	51.8
Frequency of doing exercise (*n*=246)		
Every day	67	27.2
Five days a week	37	15.0
Three days a week	70	28.5
Two days a week	41	16.7
One day per week	25	10.2
Other	6	2.4
One-time exercise duration (*n*=246)		
30 min	131	53.3
30-60 min	91	37.0
60-120 min	20	8.1
120 min and above	4	1.6

Table 7. Physical activity by different variables (*n*, %).

Variables	Physical activity	
	Yes (*n*=246)	No (*n*=264)
Sex		
Female (*n*=388)	179(72.8)	209(79.2)
Male (*n*=122)	67(27.2)	55(20.8)
Marital status		
Married (*n*=195)	82(33.3)	113(42.8)
Single (*n*=315)	164(66.7)	151(57.2)
Caring about their health before COVID-19		
Yes (*n*=406)	209(85)	197(74.6)
No (*n*=104)	37(15)	67(25.4)

Moreover, single/divorced participants had more screen time than their married counterparts during the pandemic (χ^2=21.089, *df*=2, *P*<0.001). We also found that those without children reported more screen time than those with children (χ^2=18.456, *df*=2, *P*<0.001). Besides, 83.8% of those with more extended screen time complained about negative changes to their dietary patterns (χ^2=54.560, *df*=4, *P*<0.001). The majority of those gaining weight reported longer screen time during the pandemic (χ^2=28.180, *df*=4, *P*<0.001) (Table 5). On the other hand, 48.2% reported engaging in regular exercise during the pandemic. The rate of those exercising every day was 27.2%, and 53.3% of the exercisers reported that they exercised for 30 minutes at a time (Table 6).

Although physical activity did not differ by sex (χ^2=2.868, *df*=1, *P*>0.05), we found that the single exercised more than the married (χ^2=4.835, *df*=1, *P*<0.05). Those caring about their health before COVID-19 engaged in physical activity significantly more than those who did not (χ^2=8.384, *df*=1, *P*<0.05). Moreover, regular exercisers could better manage their stress (χ^2=4.343, *df*=1, *P*<0.05) (Table 7). The participants doing at least 30 minutes of physical exercise had lower GAD-7 score (7.65±5.28) than those who did not ($t_{(508)}$=−2.354, *P*<0.05).

3.4. Participants' mental health-related characteristics

The participants' mean score of GAD-7 was 8.23±5.40; thus,

they had a moderate anxiety level (5-9 points). A total of 35.9% fell within high and severe anxiety. Most participants with severe anxiety (69.3%) reported negative changes to their sleep quality during the pandemic (χ^2=53.612, *df*=6, *P*<0.05). While 40.0% of participants with severe anxiety had shortened sleep time, 38.7% started to sleep more than before during the pandemic (χ^2=50.640, *df*=6, *P*<0.05). Anxiety negatively affected the dietary habits of 44.3% (χ^2=26.217, *df*=4, *P*<0.05) (Table 8). Besides, GAD-7 score was higher in females, the single, those without children, those with a chronic disease, those with an inability to manage stress well, and those receiving psychological support (Supplementary Table 1).

The participants losing weight during the pandemic had higher GAD-7 score (9.87±5.17) than those gaining (8.28±5.10) and not gaining weight (7.32±5.72) ($F_{(2, 507)}$=6.916, *P*<0.05). GAD-7 score was significantly higher among those with negative changes to their eating behaviors during the pandemic (9.42±5.10) than those with no changes (7.38±5.63) ($F_{(2, 507)}$ = 7.267, *P*<0.05). Moreover, those with negative sleep quality had higher GAD-7 score (10.07±5.11) than those with positive sleep quality (6.66±5.21) and no sleep quality change (6.53±5.11) ($F_{(2, 507)}$=30.173, *P*<0.05). Similarly, those with prolonged (9.26±5.08) and shortened sleep (10.31±5.55) had higher anxiety scores than those without changes to their sleep patterns (6.27±4.92) ($F_{(2, 507)}$=29.059, *P*<0.05). Those with longer screen time during the pandemic had significantly higher anxiety scores (8.60±5.28) than those with no changes to their screen time (7.20±5.67) ($F_{(2, 507)}$=3.205, *P*<0.05). Moreover, those reporting severe stress (13.62±4.30) had significantly higher anxiety scores (moderately stressed 8.29±4.21, mildly stressed 6.28±4.04, no stress at all 2.55±3.75, $F_{(3, 506)}$=121.515, *P*<0.05).

3.5. Participants' risk perception of COVID–19

The findings revealed that 22.4% of the participants had been infected with COVID-19, and 26.5% lived with individuals at risk for COVID-19 (those over 65 years old and with chronic diseases). Besides, 3.1% of the participants lost a family member due to COVID-19. About one-fifth (20.4%) of the participants did not care about their health before COVID-19, while 62.5% started to care about their health more after COVID-19.

The mean CRPS score was 25.89±6.70 (8-40). Female participants had higher CRPS scores (26.60±6.29) than male participants (23.63±7.46) ($t_{(508)}$=3.983, *P*<0.05). Those having received vocational healthcare education had higher CRPS scores (26.54±6.68) than those without healthcare education (25.19±6.67) ($t_{(508)}$=2.280, *P*<0.05); while healthcare professionals had higher CRPS scores (28.38±6.79) than those without healthcare professionals (25.45±6.60) ($t_{(508)}$=3.582, *P*<0.05), respectively. Moreover, those with mild anxiety had a lower CRPS score than others. These reporting weight loss during the pandemic, those with negative changes to their eating patterns, those with deteriorated sleep quality, and those with shortened sleep had a higher CRPS score. Finally, those starting to care about their health more after the pandemic and devoted less time to themselves during the pandemic also had higher CRPS score than others (Supplementary Table 2).

4. Discussion

The present study attempted to explore health-improving behaviors during the pandemic and to reveal the impact of the risk perception of COVID-19 on these behaviors. In this sense, we addressed the participants' dietary habits, sleep patterns, physical activity, and mental health status during the pandemic.

The effects of the pandemic on mental health, the financial impacts of restrictions, social isolation, confinement, and risk perception of COVID-19 are all believed to alter people's health-related behaviors[12]. Interestingly, as well as its adverse impacts, the pandemic has also brought positive changes to some. For example, the smoking cessation rate during the pandemic was recorded to be 8.1%. Considering those reducing smoking (11.9%), one out of every five smokers reduced or quit smoking during the pandemic. Similar to our findings, a study on smokers concluded smoking cessation rate during the pandemic was 7%[13]. Yet, it needs to acknowledge the adverse impacts of the pandemic on mental health[14]. Stress and anxiety are known to be predisposing factors for increased smoking and relapse[15]. We found that about 15% of

Table 8. Anxiety status by different variables (*n*, %).

Variables	Mild (*n*=129)	Moderate (*n*=198)	High (*n*=108)	Severe (*n*=75)
Sleep quality				
Negative change (*n*=244)	32(24.8)	93(47.0)	67(62.0)	52(69.3)
Positive change (*n*=29)	12(9.3)	7(3.5)	7(6.5)	3(4.0)
No change (*n*=237)	85(65.9)	98(49.5)	34(31.5)	20(26.7)
Sleep time				
Sleep less (*n*=118)	17(13.2)	38(19.2)	33(30.6)	30(40.0)
Sleep more (*n*=175)	30(23.2)	73(36.9)	43(39.8)	29(38.7)
No change (*n*=217)	82(63.6)	87(43.9)	32(29.6)	16(21.3)
Dietary habits				
Negative change (*n*=179)	29(22.5)	69(34.8)	50(46.3)	31(41.3)
Positive change (*n*=122)	26(20.1)	59(29.8)	22(20.4)	15(20.0)
No change (*n*=209)	74(57.4)	70(35.4)	36(33.3)	29(38.7)

the participants either increased smoking (10.8%) or started smoking (3.7%) during the pandemic. The positive effects of the pandemic on smoking cessation may not imply that one may underestimate its adverse impacts, and, thus, healthcare authorities should carry out and disseminate smoking cessation programs during the pandemic.

Obesity is recognized both as a disease and a condition increasing the likelihood of contracting a wide variety of non-communicable diseases. Less well-known is that obesity also contributes to the likelihood of infectious diseases with serious consequences, which may be the most evident in the global spread of the SARS-CoV-2 virus and the resulting COVID-19 pandemic[16]. In our study, one out of every three participants was pre-obese or obese. The relevant statistics showed that one out of every two people is pre-obese or obese[17]. Although our statistics seem better compared to the picture in Turkey and the world, the rate of pre-obesity and obesity was still high among our participants. Besides, one-third of the participants reported negative changes to their dietary patterns during the pandemic, while nearly half gained weight. Following an unhealthy diet was found to be the most important factor in the participants' weight gain. A previous study on nutrition during the pandemic reported that people's dietary patterns deteriorated due to increased unhealthy food consumption[18]. In contrast, one-fifth of the participants reported positive changes to their eating habits during the pandemic. As recommended in the World Health Organization nutrition guidelines[19], we discovered that a substantial number of participants started a healthy diet during the pandemic. What needs to be noted here is that eating habits can be affected by a number of conditions (*e.g.*, sleep, stress, and anxiety), as well as prolonged time at home or in front of the screen, food preparation style, and fruit and vegetable consumption during the pandemic. For example, the pre-pandemic data revealed that television viewing is associated with increased consumption of snacks, fast food, and carbonated drinks[20]. In our study, those with longer screen time and unhealthy eating reported gaining weight.

While nearly half of the participants experienced negative changes to their sleep quality, one-third reported starting to sleep longer during the pandemic. We found a significant relationship between prolonged sleep time and weight gain among our participants. Similar to our findings, a study examining a 10-year sleep follow-up of a group of women concluded that prolonged sleep time increased the prevalence of obesity[21]. Impairment of sleep quality is also one of the obesity-leading factors[22]. Despite the significant relationship between weight loss and deteriorated sleep quality in our study, the literature hosts studies yielding controversial findings[23]. Therefore, we may assert that some other variables (*e.g.*, increased anxiety) may trigger weight loss and poor sleep quality.

The pandemic has also brought increased screen time in communities across the world. Three-quarters of our participants reported spending prolonged time in front of the screen during the pandemic. We found that the participants with undergraduate and postgraduate education had more screen time than others. In this sense, shifting distance education and remote work during the pandemic period may have contributed to the participants' screen time.

Engaging in regular exercise seems to be a significant factor in both preventing chronic diseases and protecting mental health. We found that nearly half of the participants did any physical activity exercise regularly during the pandemic. Similarly, previous research concluded the rate of active exercises to be 40.5% during the pandemic[24]. Our findings also showed that those caring about their health even before the pandemic did regular exercise significantly more than others.

The findings also showed that those doing regular physical exercise managed their stress better and had lower anxiety scores. Doing any physical activity is known to have protective effects on the prevention of mental problems brought about by the pandemic. Despite moderate anxiety among the participants, one out of every three participants yielded high or severe anxiety levels. Depending on their mental problems, there may have been changes to their dietary patterns, which may end up with weight change. One's mental status may cause both weight gain and loss in stressful situations[25]. A number of studies on adults suggested that 35%-60% of people increase their energy intake, while 25%-40% eat less in the case of a stressful event[26]. We discovered that increased anxiety and deteriorated eating were related and that those with weight loss had higher anxiety levels. Yet, this relationship is bidirectional; while poor sleep quality and time cause stress and anxiety, increased stress and high anxiety lead to sleep disruption[27]. Similarly, in our study, a relationship was found between high anxiety state and deterioration of sleep quality and change in sleep duration. Besides, depression, anxiety, and stress may be the results of increased screen time and problematic internet use[28]. In our study, those with higher anxiety scores spent more time in front of the screen. Although one-third of the participants reported acquiring a new hobby against increased screen time and, thus, their anxiety and stress[29], we could not find a significant relationship between anxiety and adopting a new hobby.

The pandemic seems to have led half of the participants to care about their health more, which may be associated risk perception of COVID-19. Our findings demonstrated that females have an increased risk perception of COVID-19. Previous research also documented a relationship between sex and risk perception[30]. We also discovered increased risk perception of COVID-19 among those with vocational healthcare training and active healthcare professionals, which may be explained by greater awareness of risks thanks to higher health literacy. Besides, we found a lower level of anxiety to be associated with a lower risk perception of COVID-19, which overlaps with the previous findings that perceived received high risk also contribute to anxiety[31].

Obese, those with disrupted eating habits and sleep, those devoting less time to themselves, and those with increased risk perception of COVID-19 were aware of the high risk of COVID-19. While

the previous findings showed the positive effects of risk perception on compliance with personal protective measures[3] we found that increased risk perception of COVID-19 was negatively associated with health-promoting behaviors. A certain level of risk perception may facilitate avoiding the disease and complying with the measures, but the risk perception of COVID-19 may have adversely affected one's acquiring and maintaining health-promoting behaviors due to the ongoing pandemic when prevention against and avoidance from COVID-19 have become the central issues in daily life. At the same time, high-risk perception adversely affects mental health and the prognosis of chronic diseases[31]. Thus, it seems important to consider mental health-related variables while informing the public about COVID-19. In this respect, health authorities may need to express the diagnosis, treatment, and prevention methods of COVID-19 and share the daily COVID-19 data transparently.

The major limitation of the study may be that we recruited only those with a social media account or e-mail address for the study since collecting the data online.

5. Conclusion

Overall, we concluded the pandemic to bring both positive and negative impacts on maintaining and improving eating, sleep, physical activity, and mental health. Therefore, one may need to consider not only protecting their health but also improving it in such tough times. Moreover, community-based health-promoting activities should be organized to support individual efforts to cope with the pandemic.

Conflict of interest statement

The authors report no conflict of interest.

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Authors' contributions

ÇST: Concept and design of the study, data collection, and manuscript drafting; ZK: data collection, critical revision of the work.

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