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The effect of a training program on adolescents' stress levels and healthy lifestyle behaviors during the Covid-19 pandemic: A randomized controlled study

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Abstract

Topic: Adolescence is the period when people adopt healthy lifestyle behaviors and turn them into habits. Healthy lifestyle behaviors are a significant step toward a long and healthy life.

Purpose: This study investigated the effect of a training program on adolescents' stress levels and healthy lifestyle behaviors during the COVID-19 pandemic.

Methods: This randomized controlled study was conducted between May and July 2021. The sample consisted of 100 adolescents living in a city in the south of Turkey. Participants were randomized into intervention and control groups using block randomization. The intervention group participated in an online (Zoom) training program consisting of two 45 min sessions once a week for 8 weeks. Data were collected using the adolescent stress questionnaire (ASQ) and the adolescent lifestyle profile (ALP).

Results: The results showed that 73% (*n*: 73) of the participants had developed hygiene habits since the onset of the pandemic. However, the pandemic negatively affected participants' dietary habits (45%, *n*: 45), physical activity (70%, *n*: 70), coping mechanisms (68%, *n*: 68), sleep patterns (54%, *n*: 54), Internet/social media/video game addiction (64%, *n*: 64), and interpersonal relationships (57%, *n*: 57). The intervention group had a lower mean ASQ posttest score and a higher mean ALP posttest score than the control group. The intervention group had a lower mean ASQ posttest score than their pretest score. The intervention group also had a higher mean ALP posttest score than their pretest score.

Conclusions/Implications for Practice: The training program helped adolescents feel less stress and adopt more healthy lifestyle behaviors. Pediatric nurses should identify risk factors and design and implement appropriate plans to help adolescents go through future pandemics with as little damage as possible. Parents and educators should support adolescents against the adverse impacts of events such as the COVID 19 pandemic.

KEYWORDS

adolescent, covid-19, healthy lifestyle, nursing, stress

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1 | INTRODUCTION

The COVID-19 pandemic, which has spread rapidly all over the world, has become a global health problem with a total of 6.5 million deaths and 648 million COVID-19 cases as of December 2022 (World Health Organization, 2021; Worldometer, 2023). Countries have taken several measures to prevent the spread of the virus, such as "social distancing, stay-at-home orders, hygiene measures, quarantine, curfews, travel restrictions, and closures (schools and workplaces)." The virus had adverse effects on health and lifestyle, resulting in people experiencing increased levels of stress since the onset of the pandemic (Xiong et al., 2020).

Although adolescents are affected less by the virus than the elderly, they have been dealing with bio-psycho-social stressors since the onset of the pandemic. The preventive measures affect their daily routines adversely (Spinelli et al., 2020). Face-to-face education was largely suspended in most countries, and more than "1.5 billion students" have been affected by school closures due to the COVID-19 pandemic (Zhu et al., 2021). Therefore, adolescents were deprived of school and leisure activities and peer support that helped them cope with their problems. Since the pandemic, adolescents have been presenting more symptoms of depression and anxiety due to the lack of peer interaction and support, isolation, uncertainty, misinformation, and fear of infection (Oosterhoff & Palmer, 2020). Depression and anxiety are more prevalent among adolescents also because they developed unhealthy dietary habits (Jia et al., 2021; Pietrobelli et al., 2020), engaged in physical activity less often (Xiang et al., 2020), had more screen time (Kołota & Głąbska, 2021; Xiang et al., 2020), and suffered from sleep disorders (Bates et al., 2020; Guerrero et al., 2020; Zhou, Wang, et al., 2020).

Adolescence is the period when people adopt healthy lifestyle behaviors and turn them into habits. Therefore, parents and educators should implement appropriate interventions to allow adolescents to develop such behaviors. Healthy lifestyle behaviors are a significant step toward a long and healthy life. Nurses play a key role in helping adolescents develop healthy lifestyle behaviors (Pigaiani et al., 2020; Santa Maria et al., 2017). Pender's Health Promotion Model (HPM) addresses core concepts and principles that guide nurses toward that goal. The model draws attention to the learning process that affects healthy lifestyle behaviors and emphasizes the significance of health education. HPM explains the effect of cognitive processes on health promoting behaviors of the individual. The model argues that individuals are more willing to realize the goals whose results they value and that the environment can be shaped in line with their thoughts. The basis of the model is to raise awareness of individuals about the importance of healthy lifestyle behaviors. According to the model, individuals should be evaluated holistically, but parts should be considered in the context of the whole. Nurses can help behavioral change in the creation of a healthy lifestyle by using the SGM in cooperation with the individuals they serve (Pender et al., 2006; Tar, 2021). In recent years, many studies have been conducted regarding the effectiveness of education in adopting "healthy lifestyle behaviors" in adolescents (Atalla et al., 2018; Sharma et al., 2018; Xu et al., 2015). Researchers asserted that: "Online education is a safe and cost-effective option for teaching adolescents how to protect their 'physical and mental health' during the COVID-19 pandemic (Dute et al., 2016; Santa Maria et al., 2017)." However, there is no research investigating in what way online education influences adolescents' health and behaviors. Therefore, this study focused on a training program in healthy lifestyle behaviors and examined whether it helped adolescents experience less stress and adopt more healthy lifestyle behaviors.

2 | MATERIALS AND METHODS

2.1 | Design

This randomized controlled study was conducted between May and July 2021 to investigate the effect of a training program on adolescents' stress levels and healthy lifestyle behaviors.

2.2 | Participants and sample size

The study population consisted of all adolescents living in a city in the south of Turkey. Participants were recruited using simple random sampling. A power analysis was performed to determine the minimum number of participants required to detect significant differences (power of 0.80, α: 0.05 and β: 0.05), and the result was 49 for each group (GPower; v. 3.1) (Köksoy Vayısoğlu & Öncu, 2018). Therefore, the sample consisted of 100 adolescents.

2.3 | Randomization

Gender, economic status, and family type are control variables affecting adolescents' healthy lifestyle behaviors (ilhan & Yildiz, 2018). The inclusion criteria were (1) being 10–19 years of age, (2) having no health problems, (3) being a social media user, (4) having no communication problems, and (5) volunteering. Participants were assigned to "intervention (n: 50) and control (n: 50) groups" using block randomization. After the participants were classified according to the control variables gender, economic status, and family type combinations (ABAB, BABA, BBAA, ABBA, BAAB, etc.) were formed. The number of participants was divided by the number of combinations (100/5 = 20). Numbers from 1 to 5 were randomly combined 20 times (randomizer.org). The combinations (BBAA[3], ABBA[2], etc.) were put in sealed envelopes (100 pieces) by a statistician. One envelope was opened for each participant. If it was the letter "A," the participant was assigned to the intervention group. If it was the letter "B," the participant was assigned to the control group. The groups were determined by drawing lots (Bagiella, 2014). Participants in both groups had similar sociodemographic characteristics (height, weight, number of siblings, gender, birth order, family type, economic status, and parents' employment status and education) ($p > 0.05$) (Table 1).

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TABLE 1 Demographic Characteristics (n = 100).

Demographic characteristics	Group: Intervention (n = 50) X̄ ± SD	Group: Control (n = 50) X̄ ± SD	Total X̄ ± SD	Test statistics
Age (years)	14.9 ± 0.3	15.8 ±0.3	15.3 ± 1.9	t = −2.363 p = 0.020
Body height (cm)	163.3 ± 11.2	166.1 ± 11.2	164.75 ± 11.3	t = −1.273 p = 0.206
Body weight (kg)	55.5 ± 12.9	56.4 ± 11.2	55.97 ± 12.1	t = −0.387 p = 0.699
	Median ±SD (Min−Max)	**Median ±SD (Min−Max)**	**Median ±SD (Min−Max)**	
Number of siblings	4.0 ± 1.3 (1−8)	3.0 ± 1.5 (2−9)	3.0 ±1.4 (1−9)	U:−1.248
	***n* (%)**	***n* (%)**	***n* (%)**	p = 0.212
Gender				
Girl	27 (54.0)	28 (56.0)	55 (55)	X^{2*} = 0.000
Boy	23 (46.0)	22 (44.0)	45 (45)	p = 1.000
Birth order				
Oldest	9 (18)	16 (32)	25 (25)	Pearson's X^2 = 4.116
Middle child or one of the middles	22 (44)	23 (46)	45 (45)	p = 0.128
Youngest	19 (38)	15 (22)	30 (30)	
Mother's education (degree)				
Illiterate	5 (10)	7 (14)	12 (12)	Pearson's X^2 = 0.855
Primary school	27 (54)	25 (50)	52 (52)	p = 0.836
Middle school	10 (20)	8 (16)	18 (18)	
High school	8 (16)	10 (20)	18 (18)	
Father's education (degree)				
Primary school	17 (34)	20 (40)	37 (37)	
Middle school	6 (12)	13 (26)	19 (19)	Pearson's X^2 = 5.095
High school	27 (54)	17 (34)	44 (44)	p = 0.078
Mother's employment status				
Employed	3 (6)	8 (16)	11 (11)	X^{2*} = 1.634
Unemployed	47 (94)	42 (84)	89 (89)	p = 0.201
Father's employment status				
Employed	40 (80)	40 (80)	80 (80)	X^{2*} = 0.000
Unemployed	10 (20)	10 (20)	20 (20)	p = 1.000
Family type				
Nuclear	41 (82)	42 (84)	83 (83)	X^{2*} = 0.000
Extended	9 (18)	8 (16)	17 (17)	p = 1.000
Economic status				
Neutral income (income = expense)	41 (82)	35 (70)	76 (76)	X^{2*} = 1.371
Negative income (income < expense)	9 (18)	15 (30)	24 (24)	p = 0.242

t, independent sample t-test; U, Mann−Whitney U test statistics, $p < 0.05$ significance level, χ^{2*}, Chi-square test statistics (continuity correction).

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2.4 | Intervention

Before starting the research, the participants were informed about the purpose and method of the study. The intervention group participated in the online (Zoom) training program twice a week for 8 weeks. Two reminder messages were sent to the participants via WhatsApp 2 h and 30 min before the specified training time and full participation was ensured. A live link was sent to the participants before the training. Interactive participation of the participants was ensured. The training modules were created taking into account HPM's theory of raising awareness of the importance of healthy lifestyle behaviors and guiding individuals toward behavioral change (Pender et al., 2006). The program, healthy eating, physical activity, coping with stress, sleep, hygiene, tobacco/alcohol/substance addiction, internet/social media/video game addiction, rational use of media and communication issues were addressed in line with HPM. Nutrition education includes the importance of nutrients and water, factors affecting food selection in adolescents, recommendations for adequate and balanced nutrition, nutritional problems (obesity etc.) and nutrition recommendations during the COVID-19 pandemic. Physical activity training; It includes factors affecting physical activity in adolescents, the consequences of lack of physical activity, the benefits of physical activity and simple physical exercises that can be done at home during the COVID-19 pandemic period. Stress management training; It includes stress in adolescents, stressors, factors affecting stress, stress symptoms, effects of stress, COVID-19 in adolescents, and suggestions for combating stress. Sleep hygiene training; factors affecting sleep hygiene, benefits of sleep hygiene, negative effects of disruption in sleep patterns, and recommendations for sleep hygiene during the COVID-19 pandemic period. Tobacco, alcohol, and substance addiction training in adolescents; It includes addiction in adolescents, types of addiction (tobacco, alcohol, and substance addiction), factors affecting addiction, harms of addiction and protection from addiction during the COVID-19 pandemic period. Rational media use training includes internet/social media/gaming addiction, its negative effects and rational media use during the COVID-19 pandemic. Interpersonal communication training; It includes the effects of interpersonal communication, problems in interpersonal relationships, empathy and communication skills, and suggestions for socialization and interpersonal communication techniques during the COVID-19 pandemic period. The concept of hygiene was based on the relationship between cleanliness and the protection of health. Hygiene literature in adolescents covers body, hand, and genital area hygiene especially in the menstrual period. In the preparation of the training content, the book of Adolescent Health Promotion and Protection by Çınar and Cabar (2021) was taken as a guide. After the training provided to five adolescents with the prepared content, no problems were detected in terms of intelligibility. The training content was applied as it was prepared. The program was administered by a pediatric nurse and a gynecology nurse. The control group received no training (Figure 1).

2.5 | Measurements

The phone numbers of the adolescents and their parents were collected from the population records by interviewing the headman of the region where the individuals live. They were invited to study via an online questionnaire (Google Forms) link sent to all adolescents on WhatsApp. Informed consent was obtained from the adolescents and their families who agreed to participate in the study. Information was obtained from the participants with the "Personal Information Form" prepared by the researcher in line with the literature (ilhan & Yildiz, 2018). After randomization, all participants completed the pretest and posttest "Adolescent Stress Questionnaire (ASQ) and Adolescent Lifestyle Profile (ALP) II." Data collection took 15–20 min. Data were collected online in compliance with the COVID-19 pandemic measures.

The shortened version of the ASQ was developed by Anniko et al. (2018) and adapted to Turkish by Tanış (2019). The instrument consisted of 27 items scored on a five-point Likert type scale: 1 = not at all stressful (or has not happened), 2 = a little stressful, 3 = moderately stressful, 4 = quite stressful, and 5 = very stressful. Higher scores indicate higher stress levels. The Turkish version of the scale has a Cronbach's α of 0.93 (Tanış, 2019). The Cronbach's α reliability coefficient of ASQ was found 0.93 in this study.

The ALP scale was developed by Hendricks et al. (2006) and then revised in 2009 (ALP-R II). The instrument was adapted to Turkish by ilhan and Yildiz (2018). It consists of 44 items rated on a four-point Likert-type scale: 1 = never, 2 = sometimes, 3 = often, 4 = always. The total score ranges from 44 to 176. The total scale has a Cronbach's α of 0.88. Higher scores indicate more healthy lifestyle behaviors (ilhan & Yildiz, 2018). The Cronbach's α reliability coefficient of ALP was found 0.91 in this study.

2.6 | Statistical methods

The data were analyzed using the "SPSS, IBM, v 23.0" at a significance level of 0.05. Number and percentile were used for descriptive statistics. Mean, standard deviation, median, and minimum and maximum values were used for continuous variables. Normality was tested. The categorical variables were analyzed using a χ^2 test. Independent sample t-test/Mann–Whitney U test was used to compare two independent groups. A dependent sample t-test was used for dependent group comparisons.

2.7 | Ethical considerations

The study was conducted in accordance with the principles of the Declaration of Helsinki. The study was approved by the Clinical Research Ethics Committee of Osmaniye Korkut Ata University (Decision number: 2021/3/6). All adolescents and their parents were informed about the research purpose, procedure, and confidentiality

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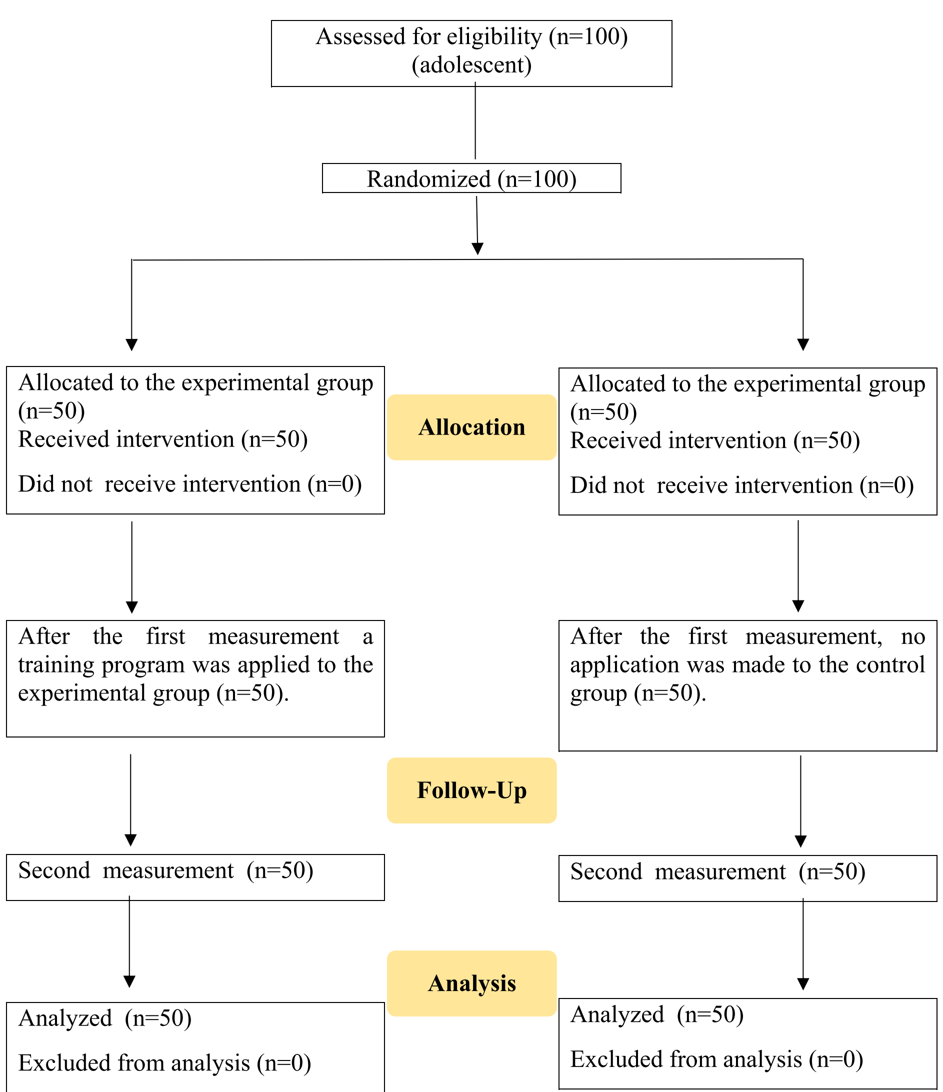

FIGURE 1 Study flowchart.

and that they could withdraw from the study at any time. Verbal and written consent was obtained from the 18-year-old adolescents who agreed to participate in the study. Written informed consent was obtained from the families after obtaining verbal consent from those under the age of 18.

3 | RESULTS

Table 1 shows the descriptive characteristics of the participants Participants had a mean age, height, and weight of 15.3 ± 2.0 years, 164.75 ± 11.3 cm, and 55.97 ± 12.1 kg, respectively. More than half the participants were girls (55%, *n*: 55). Less than half the participants were the middle child (45%, *n*: 45). Half the participants had a mother with a primary school degree (52%, *n*: 52). Less than half the participants had a father with a high school degree (44%, *n*: 44). Most participants had a nuclear family (83%, *n*: 83). The majority of the participants had a neutral income (76%, *n*: 76). Most participants had an unemployed mother (89%, *n*: 89). Less than a quarter of the participants had an unemployed father (20%, *n*: 20). The intervention and control groups were similar in terms of demographic characteristics ($p < 0.05$) (Table 1).

Table 2 presents findings regarding the impact of the COVID-19 pandemic on all participants' healthy lifestyle behaviors. Seventy three percent of participants (*n*: 73) had developed hygiene habits since the onset of the pandemic. However, the pandemic negatively affected their dietary habits (45%, *n*: 45), physical activity (70%, *n*: 70), coping mechanisms (68%, *n*: 68), sleep patterns (54%, *n*: 54), Internet/social media/video game addiction (64%, *n*: 64), and interpersonal relations (57%, *n*: 57). The pandemic did not affect most participants' tobacco/alcohol/substance addiction (85%, *n*: 85). There was a significant difference in sleep patterns ($p = 0.003$) and interpersonal relations ($p = 0.048$) due to the pandemic between groups. The difference

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TABLE 2 The effect of the COVID-19 pandemic on participants' healthy lifestyle behaviors (*n* = 100).

Healthy lifestyle behaviors	Group: Intervention (*n* = 50) *n* (%)	Group: Control (*n* = 50) *n* (%)	Total *n* (%)	Test statistics
Healthy diet				
Positive	8 (16)	7 (14)	15 (15)	Pearson's $X^2 = 1.022$
Negative	20 (40)	25 (50)	45 (45)	$p = 0.600$
No change	22 (44)	18 (36)	40 (40)	
Physical activity				
Positive	4 (8)	6 (12)	10 (10)	Pearson's $X^2 = 0.457$
Negative	36 (72)	34 (68)	70 (70)	$p = 0.796$
No change	10 (20)	10 (20)	20 (10)	
Coping with stress				
Positive	0 (0)	3 (6)	3 (3)	[a]
Negative	37 (74)	31 (62)	68 (68)	
No change	13 (26)	16 (32)	29 (29)	
Sleep				
Positive	6 (12)	8 (16)	14 (14)	Pearson's $X^2 = 11.915$
Negative	20 (40)	34 (68)	54 (54)	
No change	24 (48)	8 (16)	32 (32)	$p = 0.003$
Tobacco/alcohol/substance addiction				
Positive	1 (2)	7 (14)	8 (8)	[a]
Negative	3 (6)	4 (8)	7 (7)	
No change	46 (92)	39 (78)	85 (85)	
Internet/social media/video game addiction				
Positive	8 (16)	10 (20)	18 (18)	Pearson's $X^2 = 1.674$
Negative	35 (70)	29 (58)	64 (64)	$p = 0.433$
No change	7 (14)	11 (22)	18 (18)	
Interpersonal relationships				
Positive	2 (4)	10 (20)	12 (12)	Pearson's $X^2 = 6.062$
Negative	31 (62)	26 (52)	57 (57)	$p = 0.048$
No change	17 (34)	14 (28)	31 (31)	
Hygiene habits				
Positive	37 (74)	36 (72)	73 (73)	[a]
Negative	3 (6)	5 (10)	8 (8)	
No change	10 (20)	9 (18)	19 (19)	

[a]No test statistics due to insufficient number of cases.

X^2, Pearson's chi-square test statistics, $p < 0.05$ significance level.

arose from the fact that the intervention group participants stated that the pandemic did not change their sleep patterns (standardized residual = 2.0), while the control group participants stated that the pandemic changed their sleep patterns positively (standardized residual = 1.6) (Table 2).

Table 3 shows the participants' pretest and posttest ASQ and ALP scores. The intervention group had a lower mean ASQ posttest score and a higher mean ALP posttest score than the control group ($p < 0.001$). The intervention group had a lower mean ASQ posttest score (48.9 ± 15.8) than their pretest score (70.1 ± 23.0). The

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TABLE 3 Pretest and posttest ASQ and ALP scores ($n = 100$).

Scales	Intervention group ($n = 100$) X ± SD (min–max)	Control group ($n = 100$) X ± SD (min–max)	Test statistics
ASQ pretest	70.1 ± 23.0 (29–124)	71.7 ± 24.6 (29–120)	$t^* = -0.339$ $p = 0.735$
ASQ posttest	48.9 ± 15.8 (27–92)	70.1 ± 23.4 (29–118)	$t^* = -5.299$ $p < 0.001$
Test statistics	$t = 8.191$ $p < 0.001$	$t = 1.267$ $p = 0.211$	
ALP pretest	110.2 ± 18.8 (64–155)	105.5 ± 19.6 (61–156)	$t^* = 1.226$ $p = 0.223$
ALP posttest	138.5 ± 18.5 (96–170)	105.8 ± 18.8 (69–146)	$t^* = 8.748$ $p < 0.001$
Test statistics	$t = -14.121$ $p < 0.001$	$t = -0.176$ $p = 0.861$	

Abbreviations: ALP, adolescent lifestyle profile; ASQ, adolescent stress questionnaire.
t, paired t-test, t*, independent sample *t*-test, r, correlation coefficient, $p < 0.05$. Significance level.

intervention group had a higher mean ALP posttest score (138.5 ± 18.5) than the control group (105.8 ± 18.8). The intervention group had a higher mean ALP posttest score (138.5 ± 18.5) than their pretest score (110.2 ± 18.8) ($p < 0.001$). The training program helped the intervention group participants feel less stress and adopt more positive healthy lifestyle behaviors.

4 | DISCUSSION

This study evaluated the impact of a training program on adolescents' stress levels and healthy lifestyle behaviors during the COVID-19 pandemic. We found no other study that investigated the effect of a training program on adolescents' stress levels and healthy lifestyle behaviors during the COVID-19 pandemic. However, our conclusion that the training program lessened the stress levels of participants in the intervention group and enabled them to adopt more positive healthy lifestyle behaviors is consistent with numerous research studies conducted before the pandemic (Atalla et al., 2018; Sharma et al., 2018; Xu et al., 2015). For example, Xu et al. (2015) found that a multicomponent lifestyle intervention program helped Chinese children ($n = 1108$) learn more about healthy lifestyle behaviors and raised their awareness of obesity risk factors. Sharma et al. (2018) reported that adolescents who attended a school-based health promotion program consumed more vegetables and felt less depressed after the intervention. Atalla et al. (2018) observed that Brazilian school-aged children who participated in a 7-month intervention watched less TV and spent less time playing video games after the intervention.

The results also demonstrated that participants had adopted hygiene habits since the onset of the pandemic. The coronavirus is transmitted through droplets or direct contact. Therefore, our results indicate that adolescents had taken up the hygiene measures recommended by experts (Rundle et al., 2020). However, the COVID-19 pandemic adversely affected our participants' dietary habits, physical activity, internet/social media/video game addiction, sleep patterns, coping mechanisms, and interpersonal relations. The COVID-19 pandemic took a toll on adolescents' dietary habits as they had difficulty accessing safe food and sticking to their healthy diets due to drastic changes in their lifestyles. In other words, they have become more likely to consume unhealthy foods because they have had to change their routines and have experienced high levels of stress due to the pandemic. Our results are similar to ones reported by Jia et al. (2021) who found that young Chinese people consumed less "rice, meat, poultry, fresh vegetables, fresh fruit, soybean products, and dairy products" during the pandemic. Pietrobelli et al. (2020) also reported that children and adolescents with obesity consumed more "fruits, potato chips, red meat, and sugar-based drinks," had more screen time, and spent more time sleeping and less time doing sports during the pandemic.

Physical activity is associated with important health indicators in children and young people, such as "cardiometabolic health, motor skill development, bone density, and emotional regulation/psychological health" (Saunders et al., 2016). However, as our study results show, children and adolescents have been less physically active since the pandemic (Xiang et al., 2020). For example, they have been walking/biking less, doing less physical exercise indoors or outdoors, and playing outdoors less, whereas they have been more sedentary (including more screen time) since the pandemic (Xiang et al., 2020).

Sedentary behavior guidelines recommend no more than 2 h of recreational screen time per day for children 5–17 years of age (Australian Government Department of Health, 2021). Preliminary data has shown a significant increase in screen time (20%–66%) since the onset of the pandemic (Xiang et al., 2020). Xiang et al. (2020) reported 30 h of increase in screen time among Chinese children and adolescents ($n = 2427$) since the pandemic (Xiang et al., 2020). Kołota

and Głąbska (2021) also found that children and adolescents spent much more time watching TV during the pandemic (Kołota & Głąbska, 2021). All in all, research shows a dramatic increase in screen time among children 5–18 years of age during the pandemic (Kołota & Głąbska, 2021; Xiang et al., 2020). These trends of increasing screen time are similar to our study results.

Although unhealthy behaviors have always been common among adolescents (Rosenberger et al., 2019), the preventive measures as a response to the pandemic have made it all the more challenging for adolescents to achieve the physical activity and sleep guidelines recommended by experts (Guerrero et al., 2020). About 9–11 h of sleep is recommended for children aged 5–17. Those who get less than 9–11 h of sleep have significantly increased odds of distraction, poor academic performance, low immunity, and poor emotional and physical health (Paruthi et al., 2016). Zhou, Wang, et al. (2020) determined that almost four out of 10 Chinese adolescents and young adults had had trouble falling asleep or staying asleep, or waking up (oversleeping) since the pandemic (Zhou, Wang, et al., 2020). Bates et al. (2020) also reported disrupted sleep schedules/sleep quality in children and adolescents during the pandemic. Research shows that sleep deprivation, depression, and anxiety are more common among adolescents during the pandemic (Chi et al., 2021; Zhou, Wang, et al., 2020; Zhou, Zhang, et al., 2020). In our study, it was found that the COVID-19 pandemic negatively affected the sleep patterns of adolescents.

Since the pandemic, stress, anxiety, fear, and changes in dietary habits and school dynamics have adversely affected adolescents' mental health (de Figueiredo et al., 2021). Saurabh and Ranjan (2020) also found that quarantined children and adolescents had greater psychological distress than their non-quarantined counterparts. They also determined that more than half the participants experienced worry (68.59%), helplessness (66.11%), and fear (61.98%) under quarantine. In a study by Nocentini et al. (2021) examining the stress reactions of young people in response to the COVID-19 pandemic in Italy, 28.9% of 5295 Italian adolescents were found to show moderate to high stress reactions. In another study conducted by Ifdil et al. (2021), it was stated that Indonesian adolescents experienced severe stress during the COVID-19 pandemic. In the findings of our study, it was determined that there was a significant improvement in the postintervention stress level of the intervention group in which before the intervention, the stress level of adolescents was above average.

In our study, it was concluded that the COVID-19 pandemic negatively affected 54% of the participants sleep patterns (*n*: 54). The results of our study, in which more than half of the adolescents' sleep patterns were found to be negatively affected, are similar to the literature (Chi et al., 2021; Zhou, Wang, et al., 2020). During the pandemic, the prevalence of sleep deprivation, depression, and anxiety among Chinese middle school students during the pandemic is 21.90%, 43.70%, and 37.40%, respectively. Sleep deprivation is linked to both daytime dysfunction and emotional and behavioral problems (Chi et al., 2021; Zhou, Wang, et al., 2020).

The pandemic did not affect our participants' tobacco/alcohol/substance addiction. Kołota and Głąbska (2021) reported no increase in alcohol consumption among Polish adolescents during the pandemic. Di Renzo et al. (2020) also found a similar result regarding alcohol consumption among Italian adolescents. The difference between our study and the literature may be due to the fact that adolescents' access to tobacco/alcohol/substances was limited due to the measures taken in our country to stay at home during the pandemic period.

In our study results, it was determined that the COVID-19 pandemic negatively affected adolescents' coping mechanisms and interpersonal relationships. "Social/family support, increased awareness of mental health, and positive lifestyle changes" are key to coping with vulnerability, stress, anxiety, and helplessness during the pandemic. Children and adolescents are also more likely to change their lifestyles if they seek positive social support to cope with psychological problems caused by the pandemic. Positive lifestyle changes protect people against the adverse impacts of the pandemic (Zhu et al., 2021).

5 | PRACTICAL IMPLICATIONS

Health professionals, educators, and parents should know that they play a crucial role in protecting adolescents' physical and mental health. Among the healthcare professionals, pediatric nurses are the first to contact adolescents and their parents. Therefore, they should ensure that adolescents go through future pandemics with as little damage as possible. To that end, they should collaborate with other healthcare professionals and develop, test, and implement strategies to help adolescents experience less stress and adopt more healthy lifestyle behaviors during pandemics.

6 | LIMITATIONS

The study had two limitations. First, the findings are sample-specific, and therefore, the conclusions drawn from the results are generalizable only to the population in the study. Researchers should undertake multicentered studies with larger sample sizes. Second, we did not investigate the long-term effects of the training program. Therefore, longitudinal studies are warranted.

7 | CONCLUSION

The COVID-19 pandemic and the preventive measures took a toll on everybody, including adolescents. Our results show that adolescents adopted hygiene habits during the pandemic. However, the pandemic adversely affected their dietary habits, physical activity, internet/social media/video game addiction, sleep patterns, coping mechanisms, and interpersonal relations. By their self-report, the pandemic did not affect their tobacco/alcohol/substance addiction. Moreover,

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the training program helped our participants feel less stressed and develop more healthy lifestyle behaviors. On the other hand, we did not observe any improvement in the control group.

AUTHOR CONTRIBUTIONS

Edanur Tar Bolacali and Derya Kaya Şenol designed the study and collected data. Edanur Tar analyzed the data. Edanur Tar Bolacali and Derya Kaya Şenol prepared the manuscript. All authors approved the final version for submission.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Research data are not shared.

ETHICS STATEMENT

The study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the University Ethical Board of Clinical Research and written permission was taken from the city governor. The participation in the study had a voluntary basis and oral and written informed consent was obtained after the adolescent and parent included in the study were given information about the study, confidentiality, privacy, and their right to drop out of the study.

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