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Original Article

The Relationship Between Physical Activity, Body Image, and Eating Disorders During the COVID-19 Pandemic in High-School Girls

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Abstract

Background and aims: Decreased levels of physical activity (PA) during the coronavirus disease 2019 (COVID-19) pandemic can cause physical and psychological problems for individuals. Therefore, the aim of this study was to investigate the relationship between PA, body image, and eating disorders (EDs) during the COVID-19 pandemic among high school girls in Farsan, Iran.

Methods: This was a descriptive-analytical cross-sectional study, and the research population included female high school students from Farsan, Iran, who were studying in 2019-2020. In this regard, 535 high school girls (age: 15.95 ± 1.42, weight: 53.07 ± 10.01, BMI: 20.14 ± 3.48) were selected based on cluster-random sampling to participate in the study. Multidimensional Body Self-relation Questionnaire (MBSRQ), Baecke's Physical Activity Questionnaire, and the Eating Disorder Diagnostic Scale (EDDS) were used to collect data, and Pearson correlation coefficients were administered to establish statistical relationships.

Results: The results indicated significant positive correlations between body image and PA levels (r = 0.304, *P* = 0.001). However, no significant correlations were observed between body image and anorexia nervosa (AN) (r = -0.035, *P* = 0.424), bulimia nervosa (BN) (r = -0.033, *P* = 0.446), and binge ED (r = -0.041, P = 0.339). Likewise, no relationships were observed between PA and AN (r = 0.084, *P* = 0.052), BN (r = 0.073, *P* = 0.092), as well as binge ED (r = 0.071, *P* = 0.099).

Conclusion: During the COVID-19 pandemic, PA was positively associated with body image but not with EDs. Based on the obtained results, it can be concluded that PA improved body image in adolescent girls during the COVID-19 pandemic.

Keywords: COVID-19, Adolescent, Eating disorders, Physical activity, Body image, High school girls

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Introduction

The lifestyles of individuals have changed globally due to the coronavirus disease 2019 (COVID-19) pandemic. Staying home and being quarantined at home have become a routine part of the lives of people around the world.[1] It is not still clear that what changes will occur in the behavior of individuals in the post COVID-19 epidemic era. In recent years, however, most communities have experienced inactivity or inadequate physical activity (PA).[2] Although quarantine has been shown to be effective in preventing the spread of COVID-19, the far-reaching detrimental effects of restrictive stay-at- home measures on the individuals aged 6 to 18 years old are unknown.[3] It has been found that only 2 in 10 youth worldwide practiced the recommended 60 minutes per day of moderate-to-vigorous PA.[4] It seems that COVID-19 lockdown has deteriorated the levels of youth physical inactivity and associated comorbidities. In addition, the World Health Organization have declared that 31% of people aged 15 years and/or older do not have enough PA, and unhealthy behavior was recognized to be the cause of 3.2 million people deaths worldwide.[2] The studies evidenced that the level and intensity of PA has decreased in different countries following the COVID-19 epidemic.[5] This will undoubtedly lead to an increase in weight and fat percent gains, and fewer than 2000 steps per day will result in a loss of 2.8% of muscle mass within two weeks.[6-8] Further, recent studies have illustrated that there was a decrease in leisure time PA levels during quarantine period.[9,10] PA is a factor which exerted a positive effect on body image.[11] Body image refers to

the perception and feeling that a person has of his/her appearance; in other words, it is the negative and positive emotions that a person has about the shape and size of his/her body.[2,12] The COVID-19 pandemic has impacted the levels of youth physical inactivity.[3] Recent studies suggested that prolonged lockdowns were accompanied by a wide range of health risks across adult populations. In addition, body image disorders were associated with eating disorders (EDs) such as anorexia nervosa (AN) and bulimia nervosa (BN) and affect people's behaviors in terms of body weight or shape.[13] Several studies demonstrated that body image disorders frequently occur even before puberty and were reported by up to 50% of children and adolescents.[14,15] This disorder manifested itself in this period with symptoms such as dissatisfaction with body shape, inappropriate body shape, and incorrect perception of weight and body dimensions.[13] Based on this information, it can be concluded that physical appearance is more important for women as compared with men. A previous study demonstrated that there was a relationship between dissatisfaction with the body and diet in adolescence, resulting in EDs in many adolescents.[15] It was also reported that body dissatisfaction and EDs were associated with psychological characteristics such as physical quality of life in girls.[16]

The closure of schools during COVID-19 may induce obesity due to the reduction in the PA level of children.[17] Indeed, self-quarantine guidelines can increase sedentary behaviors associated with weight gain and obesity. It is not surprising that TV and screen time increased during self-quarantine in children and adolescence. It was revealed that increased screen time was a risk factor leading to an increased obesity,[18] and because EDs were more common in obese children than in normal-weight children,[19] these EDs along with the obesity and related behaviors may be transmitted to adulthood, causing psychological and social problems in the future.[16] Therefore, the combined effects of a stressful environment during COVIID-19 and a physically inactive lifestyle in youth act as a negative feedback loop that encourages adverse lifestyle behaviors leading to detrimental health outcomes.[3,14] School closures and home quarantine due to the spread of infectious diseases such as COVID-19 can affect the physical and mental health of children and adolescents. Research evidenced that children and adolescents were physically less active, had poor sleep patterns, and followed a meager diet when they went on weekends or summer vacations.[20] As a result, due to the scant research on the effects of quarantine at home and reduced PA on body image and EDs during this period, the present study aimed at investigating these relationships. Accordingly, we sought to determine the associations between PA levels, body image, and EDs in adolescent girls during COVID-19.

Materials and Methods

This is a descriptive-analytical cross-sectional study which was administered in cooperation with Shahrekord University, Iran, and the Department of Local Education in June 2020. The process of selecting the participants began in mid-June, after the officials of the above-mentioned department announced their agreement to cooperate with the research team. The population involved in this study was female high school students from Farsan, Iran. Statistical sampling was performed based on the cluster-random sampling method. To this end, first, Farsan was divided into 6 constituencies (Farsan, Junqan, Babaheidar, Gojan, Pardanjan, Chelicheh) based on the location of the cities. Then, a school was randomly selected from each domain, and the participating students were randomly selected based on their division. The process of selecting the participants commenced in mid-June after obtaining agreement for participation in the study by the officials of the Department of the Local Education committee. The original population of the study was 4500 high school girls from Farsan Chaharmahal and Bakhtiari Province, Iran. At the beginning of the study, the objectives of the study were explained to the subjects and informed consent forms were completed by all subjects and their parents. In addition, medical history questionnaires were completed by all subjects. Students with a history of illnesses, diabetes, high blood pressure, heart disease, and the like were eliminated from the study, and finally, a total of 535 female high school students were selected according to Morgan's formula to participate in this study.[21]

Eating Disorder Diagnostic Scale (EDDS)

Stick et al developed a self-assessment tool to assess perceptions and beliefs about EDs. EDDS is a 22-item questionnaire measuring AN, BN, and BED based on the diagnostic and statistical manual of mental disorders. This questionnaire consists of a combination of Likert scores, dichotomous scores, frequency scores, and open-ended questions such as weight and height. The first four components measured the attitude symptoms including AN and BN in the previous 3 months, and further questions relating to fear of fatness and overvaluation of weight and shape were measured using a seven-point scale, ranging from 0 (not at all) to 6 (extremely). Additionally, the next four items assessed the frequency of uncontrollable consumption of a large amount of food, focusing on the number of days per week over the past 6 months (BED) and the number of times per week over the past 3 months (BN). The subsequent four items assessed the frequency of behaviors that were conducted to compensate for binge eating over the past 3 months (e.g., vomiting, laxative use, diuretic use, fasting, and excessive exercise). Finally, subjects were asked to fill in the items related to their weight and height and were obliged to answer two questions about missed menstrual cycles and birth control pill use. The EDDS consists of a diagnostic scale and a symptom composite scale. The diagnostic scale can be used to diagnose AN, BN, and BED, while the symptom composite score indicated subjects' overall level of eating pathology, calculating a cut-off score to

differentiate individuals with EDs from healthy controls. An overall EDs symptom composite score was computed by standardizing and summing up scores across all items. Cronbach's alpha of the EDDS for the symptom composite was 0.90,[22] 0.94[23] which is regarded standard.

Multidimensional Body-Self Relation Questionnaire (MBSRQ)

The MBSRQ was employed to collect data for body image and body-self relationship. The questionnaire was already described in 1999 by Kash and Prozinski. This scale, which measures a person's attitude about various dimensions of body image structure, contains 68 expressions with three scales. Items were measured on a 5-point Likert scale with five degrees ranging from 1 to 5 (one = completely opposite and five = completely agree).[24] These scales included Body-Self Relations Questionnaire (BSRQ), Body Areas Satisfaction Scale (BASS), and Attitude about weight. BSRQ contained physical appearance, physical fitness, and health, each of which included two areas of assessment and awareness (assessment of appearance and awareness of appearance, assessment of physical fitness and awareness of physical fitness, health assessment and health awareness). BASS evaluated the satisfaction of different parts of the body including face, upper torso, middle torso and lower torso, muscle consistency, weight, height, and overall appearance. Further, attitude about weight evaluated mental preoccupation with overweight and weight assessment. This questionnaire was analyzed in two ways: based on the components of the questionnaire and based on the obtained score. Accordingly, the overall score of 69-138 was regarded as unfavorable satisfaction, while the overall score of 139-275 and of 276-345 were considered as moderate and favorable satisfaction, respectively. Cronbach's alpha for the MBSRQ was 0.75 [25] and 0.89,[26] which are regarded standard.

Baecke's Physical Activity Questionnaire

Measurement of PA level was conducted using Baecke Physical Activity Questionnaire. This questionnaire consisted of 16 questions classified into three domains: physical activities related to work, sports, and non-sports leisure time activities. Each domain had several questions scored on a 5-point Likert scale, ranging from never to always or very often. Scoring of the questionnaire followed the original system, that is, work was the mean score among eight occupational questions, sports was the mean score among four sports-related questions, and non-sports leisure time activities was the mean score among four habitual physical activities during leisure time. Each domain could receive a score from one to five points, allowing a total score from three (minimum) to fifteen (maximum). For each scale, the mean score was categorized as 1-2-3 (low level), 3-4 (medium level), and 5-6-7 (high level).[27] Cronbach's alpha for the Baecke questionnaire was 0.77-0.88,[28] which is standard.

Data Analysis

After descriptive evaluation of the research variables (mean, standard deviation, range of minimum and maximum), Pearson correlation coefficient was used to investigate the relationships between variables. The data were analyzed using the SPSS statistics (version 22.0) for Windows (SPSS Inc., Chicago, IL, USA) and the significance level was set at $P < 0.05$.

Results

Table 1 outlines the descriptive and body composition information related to subjects. A total of 535 high school girls with the mean age of 15.95 ± 1.42, weight of 53.07 ± 10.01, body mass index (BMI) of 20.14 ± 3.48 participated in this study. From these subjects, 515 completed the study procedure. Results revealed that 35.1% (n = 181) were under weight, 56.1% (n = 289) normal weight, 7% (n = 36) overweight, 1.4% (n = 7) type I obesity, and 0.4% (n = 2) type II obesity.

Table 2 depicts the self-reported PA information regarding subjects. Results of self-reported PA related to work questionnaire demonstrated that the PA of 9% (n = 48) of subjects was low, and PA of 89.1% (n = 477) and 1.9% (n = 10) of participants was moderate and high, respectively. In addition, the self-reported exercise activity of the subjects was low in 61.5% (n = 329), moderate in 27.3% (n = 146), and high in 11.2% (n = 60). Furthermore,

Table 1. Descriptive and Body Composition Information of High-school Girls

Variable	Category	N	Mean ± SD	Minimum	Maximum
Age		535 (100%)	15.95 ± 1.42	13	19
Height		515 (100%)	162.36 ± 8.11	122	190
Weight		515 (100%)	53.07 ± 10.01	30.5	90
BMI	Under weight (>18.5)	181 (35.1%)	16.91 ± 1.21	13.67	18.40
	Normal (18.5-24.9)	289 (56.1%)	21.04 ± 1.80	18.77	24.9
	Over weight (25-29.9)	36 (7%)	26.01 ± 2.03	25.1	29.7
	Obese type I (30-34.9)	7 (1.4%)	31.71 ± 0.61	31.1	32.4
	Obese type II (35-39.9)	2 (0.4%)	37.06 ± 1.13	36.15	38.22
	Total	515 (100%)	20.14 ± 3.48	13.67	38.22

Note. BMI: Body mass index; SD: Standard deviation.

Table 2. Result of Baecke's Self-reported Physical Activity of High School Girls

Variable	Level	N	Mean ± SD	Minimum	Maximum
Work score	Low (1-2.33)	48 (9%)	2.12 ± 0.14	1.75	2.25
	Moderate (2.34-3.66)	477 (89.1%)	2.93 ± 0.35	2.43	3.63
	High (3.67-5)	10 (1.9%)	4.00 ± 0.26	3.75	4.50
	Total	535 (100%)	2.88 ± 0.43	1.75	4.50
Sport score	Low (1-2.33)	329 (61.5%)	1.41 ± 0.60	0.0	2.32
	Moderate (2.34-3.66)	146 (27.3%)	2.92 ± 0.34	2.41	3.60
	High (3.67-5)	60 (11.2%)	4.30 ± 0.52	3.68	4.96
	Total	535 (100%)	2.14 ± 1.15	0.0	4.96
Leisure score	Low (1-2.33)	112 (20.9%)	2.01 ± 0.28	1.29	2.29
	Moderate (2.34-3.66)	398 (74.4%)	2.93 ± 0.36	2.29	3.93
	High (3.67-5)	25 (4.7%)	3.97 ± 0.20	3.71	4.29
	Total	535 (100%)	2.78 ± 0.57	1.29	4.29
Total score	Low (1-2.33)	170 (31.8%)	2.06 ± 0.19	1.44	2.33
	Moderate (2.34-3.66)	347 (64.9%)	2.80 ± 0.31	2.34	3.57
	High (3.67-5)	18 (3.3%)	3.94 ± 0.19	3.68	4.36
	Total	535 (100%)	2.60 ± 0.50	1.44	4.36

Note. SD: Standard deviation.

self-reported leisure time PA of subjects was low in 20.9% (n = 112), moderate in 74.4% (n = 398), and high in 4.7% (n = 25) of subjects. Finally, mean score of self-reported PA was reported to be low 31.8% (n = 170), moderate 64.9% (n = 347), and high 3.3% (n = 18) among subjects.

Likewise, Table 3 outlines the self-reported body image information of the subjects. This result suggested that self-reported body image was unfavorable in 0.2% (n = 1), moderately favorable in 93.3% (n = 499), and favorable in 6.5% (n = 35) of subjects.

Finally, Table 4 illustrates self- reported ED information about high school girls. Based on this information, 71.4% (n = 382) had no diagnosis, 2.4% (n = 13) had AN, and 16.5% (n = 88) and 9.7% (n = 52) tended to BN and BED, respectively.

Pearson correlation demonstrated significant positive correlations between body image and PA (r = 0.304, P = 0.001). However, no significant correlation was observed between body image and BMI (r = 0.009, P = 0.842), AN (r = -0.035, P = 0.424), BN (r = -0.033, P = 0.446), and BED (r = -0.041, P = 0.339) (see Table 5). Furthermore, significant negative correlations were found between PA and BMI (r = -0.089, P = 0.044), whereas between BMI was positively and significantly associated with AN (r = 0.316, P = 0.001), BN (r = 0.300, P = 0.001), and BED (r = 0.324, P = 0.001) (Table 5).

Discussion

The COVID-19 pandemic is an unprecedented health crisis as entire populations, especially school students, have been required to be self-isolated and live in home confinement for approximately two years. This in itself represents a physiological and mental challenge along with considerable health risks.[29] There is mounting evidence related to the association between sedentary behaviors and COVID-19 home confinement, obesity, and mental health.[30] However, the direct relationship of body image, PA, and EDs in high-school girls has not yet been explored. Therefore, the purpose of this study was to investigate the relationship between body image and PA, EDs, as well as BMI in high-school girls. The results demonstrated significant positive correlations between PA and body image, however, no significant correlations were detected between PA with AN, BN, and BED. Further, the results indicated that body image was not significantly correlated with AN, BN, and BED. Furthermore, significant negative correlations were found between PA and BMI.

In general, the significant positive effect of PA on the body image of adolescents was confirmed in all cases. In a previous study,[31-34] Malete et al found that the level of body satisfaction was directly related to the motivation to participate in PA of urban adolescents.[32] In addition, Bolboli et al revealed that increases in exercise time resulted in improvements in body image and reductions in body mass and social anxiety among high school male students.[33]

A recent study conducted in an urban area in Poland investigated the protective role of PA and other health-related bio-psycho components (e.g., physical fitness, body composition, body perception, and sense of coherence) in body acceptance among 231 adolescents aged 13-16 years. The results suggested that more physically active girls reported a less slim ideal vision of their figure. They concluded that daily PA contributes to positive results and more adequate and reasonable body assessments. They also concluded that PA could play a protective role in terms of mental wellbeing. However, body satisfaction varied between genders, and girls tended to be more sensitive to body satisfaction compared to boys during adolescence.[35] Finally, one study found that overweight

Table 3. Results of MBSRQ of High-School Girls

Variable	Status	N	Mean ± SD	Minimum	Maximum
Total	Unfavorable (69-138)	1 (0.2%)	138	-	-
	Moderate (139-275)	499 (93.3%)	243.18 ± 19.13	179	272
	Favorable (276-345)	35 (6.5%)	288.77 ± 12.51	276	328
	Total	535 (100%)	245.96 ± 22.40	138	328
BSRQ		535 (100%)	191.92 ± 17.56	102	265
BASS		535 (100%)	36.86 ± 7.05	9	45
Attitude about weight		535 (100%)	17.18 ± 3.57	6	26

Note. MBSRQ; Multidimensional body self-relation questionnaire; BSRQ: Body-self relation questionnaire; BASS: *Body* areas satisfaction scale; SD: Standard deviation.

Table 4. Result of Self-reported EDDS of High-School Girls

Variable	n	Mean ± SD	Minimum	Maximum
No diagnosis	382 (71.4%)	5.41 ± 3.55	0.0	14.5
AN	13 (2.4%)	16.81 ± 0.63	16.5	18.5
BN	88 (16.5%)	23.74 ± 6.41	17	44
BED	52 (9.7%)	25.17 ± 6.65	17	45

Note. EDDS: Eating disorder diagnostic scale; AN: Anorexia nervosa; BN: Bulimia nervosa; BED: Binge eating disorder; SD: Standard deviation.

Table 5. Correlations between Self-reported PA, Body Image, and ED Among High-School Girls

Variable	1	2	3	4	5	6
1. Body Image	-	R = 0.304 $P = 0.001^{**}$	R = 0.009 $P = 0.842$	R = -0.035 $P = 0.424$	R = -0.033 $P = 0.446$	R = -0.041 $P = 0.339$
2. PA		-	R = -0.089 $P = 0.044^{*}$	R = 0.084 $P = 0.052$	R = 0.073 $P = 0.092$	R = 0.071 $P = 0.099$
3. BMI			-	R = 0.316 $P = 0.001^{**}$	R = 0.300 $P = 0.001^{**}$	R = 0.324 $P = 0.001^{**}$
4. AN				-	R = 0.478 $P = 0.001^{**}$	R = 0.179 $P = 0.001^{**}$
5. BN					-	R = 0.915 $P = 0.001^{**}$
6. BED						-

Note. PA: Physical activity; ED: Eating disorder; BMI: Body mass index; AN: Anorexia nervosa; BN: Bulimia nervosa; BED: Binge eating disorder; **Correlation significant at $P < 0.01$; *Correlation significant at $P < 0.05$

people participated in more PA than normal-weight individuals to idealize their body weight. Based on these findings, we are safe to conclude that body image has a positive effect on the rate of participation in sports, and that the perception of body image may increase participation in sports.[11] Cultural, economic, and social differences, different measuring instruments, and different ages of the measured individuals can be considered as the reasons for the diversity in the prevalence of dissatisfaction with body image between different countries.[36]

As obesity and overweight have been growing worldwide in recent decades, their outcomes (e.g., body dissatisfaction and physical problems) have increased, too. Therefore, obese and overweight people try to lose too much weight and embark on strict diets to solve this problem. These behaviors in populations should not only observed for the prevention and intervention to minimize the effects of obesity, but also scientists need to understand the implications and outcomes of such behaviors for the involved individuals. Further research is also needed to account for and understand the complexity of the issues and variables contributing to the problems observed for this group of people.[6]

The low level of PA in adolescent female students with body dissatisfaction is a major problem that prevents experiencing the numerous physical and psychological health benefits. In addition, it was reported that girls experience the greatest body image dissatisfaction (more fat percentage). However, adolescent female student with positive body images (e.g., best size/don't think about it) were more likely to report an excellent health status.[15] Moreover, further studies did not evidence any correlation between body image dissatisfaction and PA; however, these results might be explained in terms of the method used to assess PA, which disallows differentiation in the amount of PA per week.[37] Another study investigating

60 university student females -aged 19.57 ± 1.37 years with pre-existing body image concerns demonstrated that 30 min of moderate-to-vigorous intensity exercise improved body image, physical self-efficacy, and physical self-perceptions.[38] Generally, the potential mechanisms underlying improvements in body image due to exercise included perceived changes in physical fitness, increases in physical self-efficacy, body awareness, strength and muscularity, and decreases in body fat.[39] Overall, some negative health outcomes resulting from COVID-19-related isolation can be minimized by implementing graded lifestyle strategies to reduce sitting time, encourage structured PA, and maintain good dietary practices. It has been shown that a fundamental level of concern induced by isolation led to a substantial reduction in energy expenditure. Therefore, it was recommended that implementing practical exercises and nutrition strategies can assist to maintaining mental and metabolic health in all populations, especially adolescent girls.[40]

The obtained results revealed that there were no relationships between body image and EDs, but significant positive correlations were found between BMI and AN, BN, and BED. However, the COVID-19 pandemic has created new situations extremely different from the time prior to the pandemic, especially in school students. The evidence from some studies suggested that EDs increased during the COVID-19 pandemic. For example, Flaudias et al examined the relationships between stress related to lockdown measures, binge eating, and dietary restriction in a sample of undergraduate French students (N = 55 738) during the first week of confinement.[41] They found that binge eating and restriction were associated with established risk factors such as female gender, low impulse regulation, high body dissatisfaction, and having a concurrent probable ED. Using an online survey during COVID-19 pandemic, a recent study explored perceived changes in eating, exercise, and body image during lockdown in the United Kingdom.[42] The results suggested that women were more likely than men to report increasing struggles with eating regulation, preoccupation with food, and negative body image. Moreover, Schleg et al examined the impact of the current COVID-19 pandemic on patients with BN. They found that approximately one half to two-thirds of former inpatients with BN experienced a negative impact of the crisis on their ED symptomatology and quality of life.[43] In addition, in a longitudinal observational study on 176 Italian college students, the researchers investigated the effects of mood states and exercise on nutritional choices during the COVID-19 lockdown. They suggested that poorer mood states possibly led to unhealthy dietary habits, which can themselves be linked to negative mood levels. Exercise led to healthier nutritional options and mediated the effects of mood states, representing a key measure in rare situations such as home-confinement.[44]

Emerging evidence suggests that the COVID-19 pandemic had a significant impact on the mental health of the entire population, especially individuals suffering from psychiatric disorders (e.g., EDs) that were particularly prevalent.[45] To date, research on the impact of COVID-19 measures on adolescent female students with EDs has been scarce. However, it might appear that the effects of COVID-19 measures reported on adult patients can also apply to adolescent patients. The stressful environment of the pandemic had an unfavorable impact on body weight and eating behaviors. It is recommended that policymakers focus more on these challenges and try to legislate for the upcoming obesity epidemic after the disappearance of the pandemic.[46] Maintaining regular PA during the COVID-19 pandemic is important for the prevention of future chronic health conditions due to a sedentary lifestyle in all people, especially school students. During crises, functional medical care and vital societal services such as providing safe environment for exercise are of the highest priority in students. As such, governments, public health authorities, and the public itself should take care in maintaining PA during the COVID-19 pandemic to prevent additional physical and mental distress.[1]

Limitations

Due to the nature of the research, the present study faced several limitations. One of the limitations was related to the choice of participants who were a specific group of students (female students); therefore, caution should be exercised in generalizing the results to male population. Another limitation of this study was the restricted geographical area. Further, considering that no training intervention was performed in the present study, it is suggested that different training interventions be used in teenagers as reported in other studies.

Conclusion

The COVID-19 pandemic had a negative effect on the mental and physical health and PA level of adolescents. In this study, it was observed that decreased levels of PA were associated with negative physical perceptions in adolescent girls. Adolescents became physically unfit during the COVID-19 era, as such, more scientific research is needed to determine how much PA was reduced in this population. Given the importance of PA for adolescents and the positive effects of exercise on the reduction of adolescent psychological symptoms, it is recommended that adolescents select an active lifestyle not only during the COVID-19 pandemic but also during their daily lives and routines.

Authors' Contributions

MF: Conceptualization, methodology, writing, reviewing, and editing. MMG: Methodology, Formal analysis, investigation, writing the original draft. ZH: Conceptualization, methodology, investigation, writing, reviewing, and editing. ZR: Conceptualization, methodology, investigation. MJ: Conceptualization, methodology, investigation. JSB: Investigation, writing reviewing, and editing.

Ethical Approval

The study considered all ethical guidelines for human studies based

on the Helsinki consensus statement and was approved by the ethical committee of Shahrekord University (SKU141/3585).

Conflict of Interest Disclosures

None.

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