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The Effect of Isolation and Controlled Social Life Periods on Physical Activity and Anxiety in Elite Athletes During the COVID-19 Pandemic

COVID-19 Pandemisi Sürecinde Elit Sporcularda İzolasyon ve Kontrollü Sosyal Yaşam Dönemlerinin Fiziksel Aktivite ve Kaygı Üzerine Etkisi

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ABSTRACT Objective: To investigate the effects of pandemic on anxiety and physical activity in elite athletes during isolation and controlled social life. The second purpose of the study was to evaluate whether the effects of isolation and restricted social life were different between genders. **Material and Methods:** A total of 52 elite athletes (80.2% national team athletes) were included in the study. Isolation and controlled social life periods were analyzed. Athlete's anxiety was evauated with Athlete's Anxiety to Catch the Novel Coronavirus (COVID-19) Scale (AACNCS), coronavirus anxiety was evaluated with Coronavirus Anxiety Scale Short Form (CAS-SF), and physical activity level was eavluated with International Physical Activity Questionnaire Short Form (IPAQ-SF). **Results:** The study indicated that during the isolation period, the anxiety levels of the athletes [AACNCS Social Anxiety score (p=0.009) and CAS-SF score (p=0.008)] were higher and their physical activity levels [IPAQ-SF total score (p<0.001)] were lower than the controlled social life period. There was no statistically significant difference between the genders (Gender* Time interactions) regarding all AACNCS scores, CAS-SF score, and IPAQ-SF total score (p>0.05). **Conclusion:** During the pandemic, the isolation period negatively affected the physical activity and anxiety of elite athletes; however, the return to the social life in a controlled manner resulted in a decrease in anxiety and increase in physical activity. These results show the importance of the correct management of the COVID-19 pandemic for elite athletes.

Keywords: COVID-19; athletes; anxiety; physical activity

ÖZET Amaç: Elit sporcularda, pandeminin izolasyon ve kontrollü sosyal yaşam sırasında anksiyete ve fiziksel aktivite üzerindeki etkilerini araştırmak. Araştırmanın ikinci amacı, izolasyon ve kontrollü sosyal yaşamın etkilerinin cinsiyetler arasında farklı olup olmadığını değerlendirmekti. **Gereç ve Yöntemler:** Çalışmaya toplam 52 elit sporcu (%80,2 milli takım sporcusu) dâhil edildi. İzolasyon ve kontrollü sosyal yaşam dönemleri analiz edildi. Sporcu kaygısı Sporcuların Yeni Tip Koronavirüse (COVID-19) Yakalanma Kaygısı Ölçeği [Athlete's Anxiety to Catch the Novel Coronavirus (COVID-19) Scale (AACNCS)], koronavirüs anksiyetesi Koronavirüs Anksiyete Ölçeği Kısa Formu [Coronavirus Anxiety Scale Short Form (CAS-SF)] ve fiziksel aktivite düzeyi Uluslararası Fiziksel Aktivite Anketi Kısa Formu [International Physical Activity Questionnaire Short Form (IPAQ-SF] değerlendirildi. **Bulgular:** Çalışma, izolasyon döneminde kontrollü sosyal yaşam dönemine göre sporcuların kaygı düzeylerinin [AACNCS Sosyal Anksiyete puanı (p=0.009) ve CAS-SF puanı (p=0.008)] daha yüksek olduğunu ve fiziksel aktivite düzeylerinin daha düşük [IPAQ-SF toplam puanı (p<0.001)] olduğunu gösterdi. Tüm AACNCS puanları, CAS-SF puanı ve IPAQ-SF toplam puanı açısından cinsiyetler (Cinsiyet*Zaman etkileşimleri) arasında istatistiksel olarak anlamlı bir fark yoktu (p>0.05). **Sonuç:** Pandemi sırasında, izolasyon dönemi elit sporcuların fiziksel aktivitesini ve kaygısını olumsuz etkilemiştir; ancak kontrollü bir şekilde sosyal hayata dönüş kaygının azalmasına ve fiziksel aktivitenin artması sağlamıştır. Bu sonuçlar, COVID-19 salgınının doğru yönetilmesinin elit sporcular için önemini göstermektedir.

Anahtar Kelimeler: COVID-19; sporcular; anksiyete; fiziksel aktivite

The coronavirus disease-2019 (COVID-19) caused by new type of Coronavirus severe acute respiratory syndrome-coronavirus-2 emerged in Wuhan, China in late December 2019 and prevailed all over the world in a short time.[1] The World Health Organization declared this as a pandemic.[2] The disease,

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which affects many systems and structures, especially the respiratory system, is rapidly spreading throughout the world.[3] The whole world has begun to seek solutions to the pandemic. Since no effective medications or vaccines were available in the beginning, to fight against its rapid spread and serious damages, many countries took preventive measures such as maintaining social distance, tele-working, and cancelling sports events.[4,5] With last technological progresses, a number of institutions worldwide have quickly begun to work on vaccines for COVID-19.[6] Due to the positive results of the vaccination studies, the vaccination process against coronavirus has started all over the world.[6]

Alike other communities, the world of sports has also been affected by COVID-19.[7] The pandemic has exposed the world of sports to an unprecedented crisis.[8] Together with several cancelled tournaments, postponed matches, and quarantined athletes, a series of negative decisions had to be made regarding sport activities.[7] All the sports events in Turkey was either canceled or postponed.[9] This negative situation significantly affected not only sports fans but also the athletes.[7,9] Gradually, the initial stringent measures started to ease. In this context, many sports competitions started again and mostly without spectators. Similarly, in our country, as of June 1,2020, sports competitions have started to be held again.[10]

Spreading rapidly among athletes, COVID-19 has physical and psychological impact on them.[7] Studies on the effects of isolation and the restricted social life following it on elite athletes are quite limited. The main purpose of our study was to investigate the effects of pandemic on anxiety and physical activity in elite athletes during isolation and controlled social life. The second purpose of the study was to evaluate whether the effects of isolation and restricted social life were different between genders.

MATERIAL AND METHODS

STUDY DESIGN AND PARTICIPANTS

A total of 52 elite athletes from different sports branches volunteered to participate in the study. Athletes who were actively engaged in sports, above 18 years of age, and able to speak and understand Turkish, were included in the study. Exclusion criterion was lack of active participation in sports due to a long-term injury.

An inquiry form was prepared on Google-form. The study was announced on social media, either in public athlete groups/pages or on the researchers' personal accounts.

Two different periods were analyzed:

i) Isolation Period: The period of lockdown and confinement when all sports events were postponed or canceled. The participants were asked to answer these questions retrospectively (considering the months of March, April, and May 2020).

ii) Controlled Social Life Period: The period of gradual deconfinement when training sessions and sports events resumed (starting from June 1).

ETHICAL COMPLIANCE

The study was conducted in accordance with the Declaration of Helsinki and the participants digitally signed online consent form. The study protocol was approved by Selçuk University Faculty of Health Sciences Ethics Committee (report number: 2020/619, date: 06/07/2020).

OUTCOME MEASURES

Initially, demographic information of the participants was collected. This included age, gender, height, weight, educational status, sports branch, number of years in sports, whether they were national team players.

Athlete's Anxiety to Catch the Novel Coronavirus (COVID-19) Scale (AACNCS)

Developed by Tekkurşun Demir et al., the Athlete's Anxiety to Catch the Novel Coronavirus (COVID-19) Scale (AACNCS) is a valid and reliable tool to measure the level of athlete's anxiety to catch the novel coronavirus. The scale consists of 16 questions. The first 11 questions are about individual anxiety related to COVID-19, and the remaining 5 questions cover social anxiety, which is characterized by intense fear of certain social situations. The lowest and highest scores that can be obtained from the individual anxiety are 11 and 55, respectively. The

lowest and highest scores in the social anxiety section are 5 and 25, respectively. The total scale score ranges between 16 and 80, where higher scores indicate increased level of anxiety, representing psychological unhealthiness.[9]

Coronavirus Anxiety Scale Short Form (CAS-SF)

The Coronavirus Anxiety Scale Short Form (CAS-SF) is a short mental health scale to evaluate the possibility of any dysfunctional anxiety in relation with the COVID-19 crisis. The total scale score ranges between 0-20 and higher scores indicate increased anxiety.[11] The Turkish version of the CAS-SF was found as a valid and reliable scale.[12]

International Physical Activity Questionnaire Short Form (IPAQ-SF)

The participants' physical activity was measured using the International Physical Activity Questionnaire Short Form (IPAQ-SF). This questionnaire addresses vigorous and moderate activities, and walking. The score for physical inactivity (the question regarding sitting) is not included in the PA score.[13] The Turkish version of the IPAQ-SF was found to be valid and reliable.[14]

SAMPLE SIZE

To the best of our knowledge, there is no study comparing physical activity and anxiety in elite athletes during isolation and controlled social life periods in COVID-19 crisis. However, a previous study showed that the crisis led to a decrease in the level of physical activity.[15] Based on this study, the calculated minimum required sample size was 48 participants for the effect size of 0.365, the probability level as 0.05, and the power level as 80%, using G*Power Software (ver. 3.1.9.2, Düsseldorf, Germany).

STATISTICAL ANALYSIS

A licensed IBM® SPSS® Statistics for Windows software (Version 22.0. Armonk, NY: IBM Corp.) was used to analyze the data. Normality was checked using Kolmogorov–Smirnov test and histograms. For continuous variables, values were expressed as mean±standard deviation and median (25-75 quartiles), and categorical variables were reported in frequencies. To determine the mean difference between isolation and controlled social life periods, the paired sample t-test (parametric) and Wilcoxon signed-rank test (non-parametric) were used. The two-way repeated measures analysis of variance was used to compare "time" and group*time interaction between the male and female participants.

RESULTS

A total of 52 elite athletes from different sports branches with a mean age of 23.15±6.6 years participated in the study. 71.2% of the participants were men and 80.2% were national team athletes. Characteristic features of the participants are given in Table 1.

Regarding AACNCS Social Anxiety, the scores for the isolation period were significantly higher than the controlled social life period (p=0.009, Table 2). However, the AACNCS individual anxiety and total anxiety scores were similar in both periods (p>0.05, Table 2).

TABLE 1: Characteristics of the participants.

Variables (n=52)	Mean±SD
Age (years)	23.15±6.6
Sex (male, %)	71.2
Height (cm)	181.92±13.0
Weight (kg)	77.37±15.9
Body mass index (kg/m^2)	23.16±3.0
Education	
High school [n, (%)]	20 (38.5)
License [n, (%)]	32 (61.5)
Sport branches	
Volleyball [n, (%)]	25 (48.1)
Gymnastic [n, (%)]	11 (21.2)
Wrestling [n, (%)]	5 (9.6)
Athleticism [n, (%)]	3 (5.8)
Ski run [n, (%)]	3 (5.8)
Tennis [n, (%)]	2 (3.8)
Handball [n, (%)]	2 (3.8)
Archery [n, (%)]	1 (1.9)
Duration of playing the sport (years)	12.21±5.7
Training time per week (hours)	17.33±10.2
National team athlete	
Yes [n, (%)]	42 (80.8)
No [n, (%)]	10 (19.2)

Values are expressed as mean±standard deviation for continuous variables and frequencies are reported for categorical variables.

Regarding CAS-SF, the scores for the isolation period were significantly higher than the controlled social life period (p=0.008, Table 2).

The participants' High Intensity Physical Activity score (p=0.001, Table 2) and IPAQ-SF total score (p<0.001, Table 2) in the isolation period were significantly lower than those in the controlled social life period. In addition, the physical inactivity (sitting time) of the participants in the Isolation Period was significantly higher than the controlled social life period (p=0.001, Table 2).

There was no statistically significant difference between the genders (gender*time interactions) regarding all AACNCS scores and CAS-SF score (p>0.05, Table 3).

There was no statistically significant difference between the genders (gender*time interactions) regarding all IPAQ-SF scores (except walking) (p>0.05, Table 4).

DISCUSSION

Our study is the first study in the literature investigating the effects of isolation and controlled social life periods on physical activity and anxiety in elite athletes during the COVID-19 pandemic. The main finding of the study indicated that during the isolation period, the anxiety levels of the athletes were higher and their physical activity levels were lower than the controlled social life period. According to our results, there was no difference between male and

TABLE 2: Comparison of outcomes between isolation and controlled social life periods.

	Isolation period	Controlled social life period	p value
AACNCS			
Individual score (11-55)	40.25±9.7	40.52±9.6	0.731[a]
Socialization score (5-25)	15.90±5.6	14.75±5.5	0.009[a]
Total score (16-80)	56.15±14.1	55.27±14.1	0.412[a]
CAS-SF			
CAS-SF score (0-20)	0.0 (0.0-1.0)	0.0 (0.0-0.0)	0.008[b]
IPAQ-SF			
Vigorous (MET min/wk)	1800.0 (90.0-5600.0)	4320.0 (780.0-7200.0)	0.001[b]
Moderate (MET min/wk)	720.0 (370.0-1440.0)	1080.0 (420.0-1920.0)	0.117[b]
Walking (MET min/wk)	594.0 (198.0-1027.0)	643.5 (272.25-1040.0)	0.235[b]
Total (MET min/wk)	3106.5 (1558.0-8435.5)	6142.5 (2610.0-9492.5)	<0.001[b]
Sitting time (min/day)	240.0 (180.0-300.0)	180.0 (120.0-300.0)	0.001[b]

Note: a:Paired sample t-test, b: Wilcoxon signed-rank test.
Bold values indicate significant p values (<0.05).
AACNCS: Athlete's anxiety to catch the novel coronavirus (COVID-19) scale; CAS-SF: Coronavirus anxiety scale-short form;
IPAQ-SF: International physical activity questionnaire short form.

TABLE 3: Comparison of anxiety between males and females.

	Male (n=37)			Female (n=15)				
Outcome measures	Isolation period	Controlled social life period	p[1]	Isolation period	Controlled social life period	p[1]	p[2] Time	Gender*Time
AACNCS								
Individual score (11-55)	38.32±9.3	39.05±9.2	0.419	45.00±9.2	44.13±9.8	0.593	0.937 (<0.001)	0.359 (0.017)
Socialization score (5-25)	15.03±5.1	14.14±4.9	0.059	18.07±6.3	16.27±6.8	0.078	0.006 (0.142)	0.336 (0.019)
Total score (16-80)	53.35±13.0	53.19±13.1	0.888	63.07±14.6	60.40±15.7	0.287	0.236 (0.028)	0.294 (0.022)
CAS-SF								
CAS-SF score (0-20)	1.14±2.8	0.78±2.1	0.146	1.07±1.7	0.33±0.9	0.036	0.013 (0.116)	0.371 (0.016)

Note: p[1], paired sample t-test; p[2], two-way repeated measures analysis of variance. Values are expressed as mean ± standard deviation. Figures in parentheses are effect sizes.
Bold values indicate significant p values (<0.05).
AACNCS: Athlete's anxiety to catch the novel coronavirus (COVID-19) scale; CAS-SF: Coronavirus anxiety scale-short form.

TABLE 4: Comparison of physical activity between males and females.

	Male (n=37)			Female (n=15)				
	Isolation	Controlled social	p^1	Isolation	Controlled social	p^1	p^2	
Outcome measures	period	life period		period	life period		Time	Gender*Time
IPAQ-SF								
Vigorous (MET min/wk)	3674.5±4745.3	5060.5±4953.6	0.031	2933.33±3527.0	4346.67±4092.5	0.029	0.010 (0.127)	0.979 (<0.001)
Moderate (MET min/wk)	1040.54±888.3	1481.62±1658.2	0.088	1248.0±1379.3	1496.0±1492.5	0.429	0.125 (0.046)	0.664 (0.004)
Walking (MET min/wk)	783.05±930.4	749.65±906.3	0.668	722.73±4855.5	1107.7±979.5	0.72	0.049 (0.076)	0.020 (0.104)
Total (MET min/wk)	5498.22±5474.9	7291.81±6195.1	0.033	4904.0±4496.7	6950.4±5472.9	0.025	0.007 (0.134)	0.885 (0.001)
Sitting time (min/day)	235.54±114.9	202.43±115.5	0.005	288.6±187.1	220.0±184.1	0.063	0.001 (0.215)	0.202 (0.032)

Note: p^1, paired sample t-test; p^2, two-way repeated measures analysis of variance. Values are expressed as mean±standard deviation. Figures in parentheses are effect sizes. Bold values indicate significant p values (<0.05)

IPAQ-SF: International physical activity questionnaire short form.

female elite athletes in terms of physical activity and anxiety levels in either isolation or controlled social life periods.

The COVID-19 pandemic has adversely affected many people around the world both physically and psychologically.[16] These negative effects have caused a crisis in the world of sports. Several national and international sports events were postponed or canceled in almost all branches.[7] Gradually, these stringent measures started to ease. In this context, many sports competitions started again, mostly without spectators.[10] The pandemic has been shown to increase anxiety among general population and similarly among athletes.[9,17] A previous review showed that psychosocial outcomes are far bigger than are being perceived.[18] The COVID-19 pandemic has an effect on the mental health of individuals.[19] Lack of a study in the literature investigating the effects of isolation and controlled social life on anxiety in elite athletes during the COVID-19 pandemic makes it difficult to compare our results. However, the fact that anxiety was found to be significantly higher during the isolation period indicates that elite athletes were more affected in the first period of the pandemic. Future studies are needed to validate these results.

Physical activity is linked with a decreased risk of the chronic diseases developing associated with the COVID-19.[20] However, measures such as isolation, social distance, and quarantine against the COVID-19 pandemic caused a decrease in the level of physical activity.[21] Although these measures were successful in slowing the spread of the disease, they led to physical inactivity and psychological burden.[22] A previous study reported a decrease in physical activity as a result of the COVID-19 pandemic.[15] Likewise, our study found that the vigorous and total physical activity levels of the athletes were significantly lower in the isolation period compared to the controlled social life period. In addition, it was found that sitting time (i.e. physical inactivity level) was higher during the isolation period. These results indicate that the measures taken in the first period of the pandemic negatively affected the physical activity level of elite athletes alike general population.

Our results also revealed that male and female elite athletes were similar in terms of physical activity and anxiety levels during both isolation and controlled social life periods. To the best our knowledge, there is no study in the literature investigating the gender-specific effects of the COVID-19 pandemic on elite athletes. However, a study reported that women were more mentally affected by the COVID-19 pandemic than men.[23] Future longitudinal studies will be a guiding light to verify these results.

This study has some limitations that need to be addressed. Only elite athletes were included in our study. Adding healthy non-athlete individuals to the study sample would produce detailed results regarding the effects of change in physical activity and anxiety on athletes. The athletes were evaluated as a single group regardless of the sport they did and their branches. There might be differences between the team or individual sports players that could affect the results.

CONCLUSION

This is the first study in the literature investigating the effects of isolation and controlled social life periods on physical activity and anxiety in elite athletes during the COVID-19 pandemic. During the pandemic, the isolation period negatively affected the physical activity and anxiety of elite athletes; however, the return to the social life in a controlled manner resulted in a decrease in anxiety and increase in physical activity. These results show the importance of the correct management of the COVID-19 pandemic for elite athletes.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

***Idea/Concept:** İsmail Özsoy, Muhammed İhsan Kodak, Caner Karartı, Gülşah Özsoy; **Design:** İsmail Özsoy, Muhammed İhsan Kodak, Caner Karartı, Gülşah Özsoy; **Control/Supervision:** İsmail Özsoy, Muhammed İhsan Kodak; **Data Collection and/or Processing:** İsmail Özsoy, Muhammed İhsan Kodak, Caner Karartı, Gülşah Özsoy; **Analysis and/or Interpretation:** İsmail Özsoy, Gülşah Özsoy; **Literature Review:** İsmail Özsoy, Muhammed İhsan Kodak, Caner Karartı, Gülşah Özsoy; **Writing the Article:** İsmail Özsoy, Gülşah Özsoy; **Critical Review:** İsmail Özsoy, Gülşah Özsoy; **References and Fundings:** İsmail Özsoy, Muhammed İhsan Kodak, Caner Karartı, Gülşah Özsoy; **Materials:** İsmail Özsoy, Muhammed İhsan Kodak, Caner Karartı, Gülşah Özsoy.*

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