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Research Article / Araştırma Makalesi

Effects of COVID-19 pandemic on the psychological states of youth and adult elite male athletes

COVID-19 salgınının genç ve yetişkin elit erkek sporcuların psikolojik durumları üzerindeki etkileri

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ABSTRACT

Objective: Although the psychological states of athletes were negatively affected during the COVID-19 pandemic, there is a lack of studies examining the psychological impact on athletes according to age, sports discipline, and contact requirement of the sport. The aim of this study was to evaluate the psychological effects of the COVID-19 pandemic on elite athletes according to age, sport discipline (team-individual), and contact requirements of the sports (contact and non-contact).

Material and methods: Three questionnaires (Depression anxiety stress scale-21, Impact of events scale (IES), International physical activity questionnaire (IPAQ)) were sent to participants' smartphones, six weeks after professional football leagues were postponed. The online survey was completed by 440 athletes and 126 non-athlete volunteers. Athletes were divided into three groups as follows; team sports, individual contact, and individual non-contact-sports. Also, each group was subdivided into two age groups as youth and adult.

Results: Depression, anxiety, and stress scores for the team sports were significantly lower than individual contact-sports ($p<0.01$ each) and individual non-contact-sports ($p=0.02$, $p<0.01$, $p<0.01$, respectively). IES score for the team sports was significantly lower than the individual contact sports, individual non-contact sports, and non-athlete volunteers ($p<0.01$, $p=0.02$, $p=0.04$, respectively). There was no other significant difference between the scale scores of the groups (athletes-control, or youth-adult) ($p>0.05$).

Conclusion: Mental health status of team sport athletes were relatively protected, whereas, individual contact sports athletes were highly affected. The psychological states of individual contact athletes should be monitored closely, and necessary psychosocial support should be provided to create coping strategies.

Keywords: *SARS CoV-2, sportsman, mental health, assessment*

ÖZ

Amaç: COVID-19 salgını sırasında sporcuların psikolojik durumları olumsuz etkilendiği bilinse de sporcuların psikolojik etkilenmelerini yaş, spor türü ve sporun temas gereksinimine göre inceleyen çalışma eksikliği göze çarpmaktadır. Bu çalışmanın amacı, COVID-19 salgınının elit sporcular üzerindeki psikolojik etkilerini yaş, spor türü (takım-bireysel) ve sporun temas gereksinimine (temaslı-temassız) göre değerlendirmektir.

Gereç ve yöntemler: Profesyonel futbol liglerinin ertelenmesinden altı hafta sonra katılımcıların akıllı telefonlarına üç anket (Depresyon anksiyete stres ölçeği-21, Olayların etkisi ölçeği (OEÖ), Uluslararası fiziksel aktivite anketi (UFAA)) gönderildi. Çevrimiçi anket, 440 sporcu ve 126 sedanter gönüllü tarafından dolduruldu. Sporcular takım sporları, bireysel temas ve bireysel temassız sporlar olmak üzere üç gruba ayrıldı. Ayrıca her grup genç ve yetişkin olmak üzere iki yaş grubuna ayrıldı.

Bulgular: Takım sporlarında depresyon, anksiyete ve stres skorları bireysel temaslı sporlardan ($p<0.01$) ve bireysel temassız sporlardan (sırasıyla $p=0.02$, $p<0.01$, $p<0.01$) anlamlı ölçüde düşüktü. Takım sporları için OEÖ skoru, bireysel temaslı sporlar, bireysel temassız sporlar ve sedanter gönüllülerden anlamlı ölçüde düşüktü (sırasıyla $p<0.01$, $p=0.02$, $p=0.04$). Grupların (sporcu-kontrol ya da ergen-yetişkin) ölçek puanları arasında başka anlamlı farklılık yoktu ($p>0.05$).

Sonuç: Takım sporu yapan sporcuların mental sağlığı görece korunmuş görünürken, bireysel temas sporları yapan sporcuların bu süreçten daha fazla oranda etkilenmiştir. Özellikle bireysel temaslı sporcuların psikolojik durumları yakından izlenmeli ve baş etme stratejilerinin oluşturulması için gerekli psikososyal destek sağlanmalıdır.

Anahtar Sözcükler: *SARS CoV-2, sporcu, mental sağlık, değerlendirme*

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INTRODUCTION

The COVID-19 pandemic and implemented restrictions such as quarantine and self-isolation have caused significant worldwide impact with specific effects on the sports community. As a result of the restrictions, sports activities were limited, and the sports community entered an obscure era. Accordingly, competitions in most sports disciplines in Turkey, such as professional football were postponed until further statement due to the coronavirus pandemic, and athletes were isolated from social interaction (1).

Although restrictions are necessary to reduce the spread of the virus in a pandemic, the side effects of the implemented restrictions should not be ignored (2). It is known that individuals placed under isolation are more likely to experience emotional imbalance, difficulties in self-regulation and compliance, loss of freedom, and psychological impacts like depression, anxiety, and stress (2-4). Also, fear of infection, uncertainty about immunity, worry about mutant viruses and concerns about job insecurity may exacerbate the negative psychological effects, and may cause serious consequences such as suicide (5,6).

The psychological effects of COVID-19 may have more harmful consequences in vulnerable groups (7). When factors affecting the mental health of athletes are examined, it can be seen that athletes are exposed to various sports-related stressors beyond those experienced by the general population, such as early career termination, serious injury, performance impairments, social media abuse, and concerns about sponsorship. Furthermore, the COVID-19 pandemic has also created several new stressors on the mental health of athletes (e.g., worrying about being infected, loss of income, uncertain long-term effects, and potential sequelae of COVID-19 (8).Thus, researchers emphasized that athletes suffered from various mood disorders such as depression, anxiety, stress, and post-traumatic stress disorder (9-13).

Given that coronavirus can be transmitted easily by droplets and close contact, the contact requirement of sports' nature has become more important (14). Fear of being infected by COVID-19 in contact sports would be a concern that threatens the mental health of athletes; whereas, social support in team sports may reduce the negative psychological effects. On the other hand, since younger age is a risk factor in maintaining mental health during a pandemic, the psychological states of younger athletes may be more affected than their adult counterparts (15). Sprang et al. reported that children in quarantined displayed four times higher post-traumatic stress scores than unquarantined ones (16). Additionally, since career transition (from youth to senior) is a critical phase in youth athletes' life, the latter are more likely to be affected negatively by the restrictions than adult athletes (17).

It should be determined which groups of athletes are more likely to be negatively affected psychologically to ensure timely interventions. However, to our knowledge, there are insufficient studies evaluating the psychological states of elite athletes according to age, sport discipline (team-individual), and contact requirement of the sport. The purpose of this study was to evaluate the psychological effects of the COVID-19 pandemic on Turkish elite-level athletes according to these factors. It was hypothesized that the psychological states of individual contact sports and youth athletes would be more negatively affected than others.

MATERIALS AND METHODS

Study design

This cross-sectional online study was designed in accordance with the Helsinki declaration. The study was approved by local ethics committee (20-6T/27). All volunteers were informed about the study and their consent was obtained. Six weeks after professional football leagues were postponed, questionnaires were sent to participants' smartphones by sharing the questionnaire link (Google Forms) with sports clubs, managers and coaches. As the smallest sample size, which reflects the all-athlete groups we included in the study, was calculated according to sample size as 328, data collection was terminated when sufficient number was reached.

Participants

Athletes participating in Turkish Football Super League, Turkish U19 Football League, Volleyball Super League, Volleyball U19 League, Athletics Super League, Athletics U20 League, and athletes participating in national or international competitions in cycling, wrestling and kickboxing were invited to complete a questionnaire that examined their depression, anxiety, stress and physical activity levels. Inclusion criteria were being male, aged between 16-35 years, and continuing to participate in sports throughout the 2019-2020 season. Also, non-sports volunteers who were known by the authors and thought not to be exercising regularly (no more than a day per week for the last two years) were included in the study as the control group. The online survey was completed by 480 athletes and 160 control volunteers. Since female football players, wrestlers and cyclists were not enough, only male athletes were evaluated in the study. Another 40 athletes and 34 non-sports volunteers were excluded from the study due to not meeting the criteria. Then, three different groups were formed as team sports (football and volleyball), individual non-contact (athletics and cycling) or contact (wrestling and kickboxing) sports.

In addition, each group was subdivided into two age groups of youth (16-19) and adults (20-35) (18).

Questionnaires

Depression anxiety stress scale-21 (DASS-21)

The DASS-21 scale consists of 21 items, three subscales (depression, anxiety and stress), and is scored by a 4-point Likert-type scale (ranging from 0=never to 3=always) (19). By summing the scores for the items obtained from the subscales, the total score for each sub-scale was calculated. Higher scores indicate higher levels of depression, anxiety and stress. Vaughan et al. also stated that the DASS-21 has sufficient psychometric properties in elite athletes (20). The least mild severity cut-off values for depression, anxiety and stress were reported as ≥5, ≥4 and ≥8, respectively. For depression, anxiety and stress subscales, Cronbach's alpha internal consistency coefficients were 0.89, 0.87 and 0.90, respectively (21).

Impact of event scale-revised (IES-R)

The scale consists of 21 items and is scored by a 4-point Likert-type scale (ranging from 0=not at all to 4=extremely) (22). This is a self-reported scale that evaluates stress symptoms related to trauma of avoidance, over-excitation and experience during a serious life event, a public health crisis, or any trauma that threatens society. Cronbach's alpha internal consistency coefficient was 0.93 (23).

International physical activity questionnaire (IPAQ-short form)

The questionnaire consists of seven questions and provides information about the frequency and duration of walking, moderate and vigorous activities over the last week (24). Durations are multiplied by the known Metabolic Equivalent of Task (METs) values per activity and the results of all items are summed to calculate the total physical activity score. The validity and reliability in Turkish was examined by Saglam et al. (25).

Statistical analysis

IBM SPSS Statistics for Windows, Version 25.0 (Released 2017, Armonk, NY: IBM Corp.) and SAS Version 9.3 package programs were used for statistical analysis. The chi-square test was used to compare categorical variables between groups. The Kolmogorov Smirnov test was applied to examine whether the numerical variables have normal distribution, and non-parametric methods were preferred in comparisons since there was no fit ($p<0.05$). The sports group (team, individual-contact, individual-non-contact) and age factors were evaluated using the nonparametric factorial ANOVA method. Additional analyses were applied to variables, where the interaction was not significant ($p>0.10$). The differences between the sports groups were examined with ANOVA. Scale scores were summarized using median (minimum-maximum) statistics. A $p<0.05$ level was considered statistically significant.

RESULTS

Sports distribution of participants is presented in Table 1.

Table 1. Ages and sports types of the participants

Age group	Type of sport	N	(%)	Age
Adult	Team sports	48	8.4	
	Football	27	4.7	25.5±4.0
	Volleyball	21	3.7	
	Ind. non-contact sports	72	12.7	
	Athletics	56	9.9	23.6±3.4
	Cycling	16	2.8	
	Ind. contact sports	72	12.7	
	Wrestling	40	7.0	22.9±3.4
	Kickboxing	32	5.7	
	Non-athletes	66	11.6	27.6±4.0
Youth	Team sports	106	18.7	
	Football	83	14.7	17.0±1.0
	Volleyball	23	4.0	
	Ind. non-contact sports	68	12.0	
	Athletics	46	8.1	17.2±1.1
	Cycling	22	3.9	
	Ind. contact sports	74	13.1	
	Wrestling	47	8.4	17.5±1.0
	Kickboxing	27	4.7	
	Non-athletes	60	10.6	17.3±1.0

Ind: individual; ages as mean ± SD; total N=566.

When age and sports groups were evaluated together, there was no significant interaction ($p=0.34$). The difference between sports groups was statistically significant ($p=0.02$), whereas the difference between age groups was not significant ($p=0.66$).

Depression anxiety stress scale-21 (DASS-21)

Among 440 athletes, 156 (35.6%) reported symptoms of at least mild severity for depression (≥5). The proportions were 30% (n=132) for both anxiety (≥4) and stress (≥8). Depression, anxiety and stress scores of the team sports group were significantly lower than individual contact ($p<0.01$, $p=0.02$, $p<0.01$, respectively) and individual non-contact ($p<0.01$ for each) sports groups (Table 2). Depression and stress scores of the team sports group were significantly lower than the non-athletes ($p<0.01$ and $p=0.01$, respectively). Stress scores of the individual contact sports group were significantly higher than the non-athletes ($p=0.02$) (Table 2). There was no other significant difference between the scale scores of the groups ($p>0.05$). When all participants are evaluated together, depression scores were highly correlated with anxiety and stress scores ($r=0.57$, $p<0.01$; $r=0.67$, $p<0.01$; respectively) (Table 3).

Table 2. Comparison of values obtained from scales by ages and sport groups

Parameter	Team sports		Ind. NC sports		Ind. C sports		Non-athletes		ANOVA
	Adult	Youth	Adult	Youth	Adult	Youth	Adult	Youth	
Depression	2 (0-42)	2 (0-30)	6 (0-36)	3 (0-24)	2 (0-38)	4 (0-26)	2 (0-36)	4 (0-22)	p=0.68
	p=0.76								
	p<0.01** btw. Team-Ind. NC, Team-Ind. C athletes and Team-Non-athletes								
Anxiety	4 (0-42)	2 (0-40)	7.5 (0-42)	6 (0-42)	10 (0-42)	6 (0-42)	6 (0-42)	7 (0-40)	p=0.34
	p=0.67								
	p<0.01** btw. Team-Ind. NC athletes; p=0.02* btw. Team-Ind. C athletes								
Stress	6 (42)	6 (0-36)	14 (0-42)	10 (0-42)	10 (0-42)	12 (0-42)	10 (0-34)	8 (0-36)	p=0.64
	p=0.59								
	p<0.01** btw. Team-Ind. NC and Team-Ind. C athletes; p=0.01* btw. Team-Non-athletes; p=0.02* btw. Ind. C athletes-Non-athletes								
Total IES-R	15 (0-87)	13.5 (0-58)	23 (0-65)	19.5 (0-84)	24 (0-76)	21.5 (0-72)	18 (0-81)	18 (0-86)	p=0.36
	p=0.57								
	p<0.01** btw. Team Ind. NC and Team-Ind. C athletes; p=0.04* btw. Team-Non-athletes								

Figures as median (min-max); N total=566; **: p<0.01; *: p<0.05; Ind.: individual, C: contact, NC: non-contact; IES-R: Impact of events scale-revised

Impact of event scale-revised (IES-R)

Among athletes (n=440), 35.6% of them (n=156) reported moderate or severe psychological impact score. The impact of event scale score in the team sports group was significantly lower than individual contact sports (p<0.01), individual non-contact sports (p<0.01), and non-athletes (p=0.04) (Table 2). There was no other significant difference between the scale scores of the groups (p>0.05). The impact of event scale score was highly correlated with depression, anxiety and stress scores (p<0.01 for each) (Table 3).

Table 3. Relationship between variables according to Spearman correlation analysis (n=566)

Parameter	Total IPAQ	IPAQ SB	Depression	Anxiety	Stress	Total IES-R
Total IPAQ	1.00					
IPAQ SA	r=-0.21 p=<0.01**	1.00				
Depression	r=-0.13 p<0.01**	r=0.12 p<0.01**	1.00			
Anxiety	r=-0.03 p=0.36	r=0.02 p=0.49	r=0.57 p<0.01**	1.00		
Stress	r=-0.04 p=0.28	r=0.06 p=0.11	r=0.67 p<0.01**	r=0.55 p<0.01**	1.00	
Total IES-R	r=-0.03 p=0.35	r=0.06 p=0.11	r=0.61 p<0.01**	r=0.57 p<0.01**	r=0.63 p<0.01**	1.00

N=566; **: p<0.01; IPAQ: International physical activity questionnaire; SB: sedentary behavior; SA: Sedentary activity; IES-R: Impact of events scale-revised

International physical activity questionnaire (IPAQ-short form)

Forty-nine percent of the athletes reported high, 41.1% moderate, and 9.8% low for the physical activity scores. Low physical activity and high sedentary behavior scores were associated only with high depression score (r=-0.13, p<0.01 and r=0.12, p<0.01, respectively). There was no correlation between physical activity or sedentary behavior scores and anxiety, stress, and the impact of event scale scores (p>0.05) (Table 3).

DISCUSSION

The main findings of this study were that 1) approximately one in three athletes reported high depression, anxiety, stress, and the impact of event scores; 2) there was no difference in the psychological state between youth and adult athletes; 3) team sports athletes reported lower depression, anxiety, and stress scores than individual contact and individual non-contact sports group; 4) stress scores of the individual contact sports group were higher than sedentary volunteers.

It is known that the pandemic negatively affects the psychological states of individuals in quarantine (4). In an immediate report after the COVID-19 pandemic declaration, it was stated that approximately one-third of people in quarantine reported depression, anxiety and stress symptoms (3). Also, it was reported that ranging from 20% to 40% of athletes suffered from depression, anxiety and stress that were caused by social isolation and home quarantine (9-13). In line with literature, our results reveal the negative

tes. This result may be explained by many reasons. Firstly, fear of being infected by COVID-19 should be a major concern for psychologicalstate (26,27). Secondly, psychological factors such as difficulties in self-regulation, lack of motivation, and having inadequate external coping strategies may have exacerbated the negative psychological impacts (28). Since only elite-level athletes participated in this study, the higher athletic identities of elite-level athletes may have made them more vulnerable (29). On the other hand, performance concerns that negatively affects the psychological states of athletes may be a major issue. Elite-level athletes who have higher performance demands such as greater initial muscle mass, better balance, and coordination skills may be more affected by detraining that was caused by restrictions (30). The association between low physical activity and high depression scores in our study reveals the importance of continuing training in protecting the mental health of athletes (31,32). Lastly, economic loss, career disruption, and uncertainties about the future may have exacerbated the negative psychological impacts of the pandemic (33). Therefore, elite-level athletes should be monitored closely. Mental health problems of athletes should be detected early to ensure appropriate and timely intervention.

Young age is a risk factor in maintaining mental health (15). It is also known that building coping strategies that improve mental health is more difficult for adolescents than adults (34). Also, it is known that career transition (youth to senior) is a critical phase in athletes' life (17). In line with literature, we hypothesized that the psychological states of youth athletes would be more affected than adult ones. However, we found that there was no difference between the psychological states of youth and adult athletes. Firstly, considering that job insecurity during the COVID-19 pandemic is associated with worse mental health, higher economic loss in adult athletes may have led to higher depression, anxiety and stress levels (5). Also, adult athletes might worry about their health status more than youth ones; therefore, they may tend to be more anxious. On the other hand, youth athletes are more open to receive assistance than adults (35). Coaches have more effective roles on youth athletes, thereby, youth athletes may have built coping strategies easier with coach support (36). Gerber et al. also reported that elite sport is not an additional source of distress for youths (37). Lastly, given that younger players are often not married and live with their parents, the negative psychological effects of implemented restrictions may have been reduced by family support (38). However, considering that there is a lack of studies in youth athletes, future studies evaluating the psychological states of youth athletes should be conducted.

Although competition between teammates can negatively affect the psychological states of athletes in team sports, it is suggested that team sports are more effective in maintaining mental health than individual sports through increased social interaction (39). Social support also plays an important role in preventing depression (38). Our results, in line with our hypothesis show that individual contact sports were affected more negatively compared to team sports and individual non-contact sports.

Most of the studies conducted during the COVID-19 pandemic did not reveal a significant difference between psychological states in team sports and individual sports; whereas it is noticeable that these studies did not evaluate the psychological states of athletes according to the type of contact (9-12,28). We thought that fear of being infected with COVID-19 by close contact due to the nature of the sport, and the lack of social support may cause a major concern that negatively affected the psychological states of individual contact athletes. Also, the fact that having much lower incomes, individual contact sports athletes' psychological states may have been affected more negatively (5).

Since medical team and coaches might try to find ways to protect more popular athletes first, less popular athletes such as individual ones may have faced more challenges during the restrictions. Moreover, in accordance with the Turkish Football Federation rules, the fact that a negative PCR test result is required before each competition may have reduced the negative impact of high-frequency contact in team sports. Lastly, the fact that individual contact sports are performed indoors, and unwanted changes in weight in combat sports may have been extra stressors for their psychological states (40). The results demonstrated that individual contact sports were the most vulnerable group in maintaining mental health. They should be monitored carefully, and necessary precautions should be taken.

The study has some limitations. Firstly, there was no clinical assessment, and all data were collected via athlete self-reports. Secondly, the study is limited to Turkish athletes. Since the coping strategies of athletes living in different cultures and societies may be different, it may not be correct to generalize the results to all athletes. Thirdly, since female athletes were not included in the study, differences in the psychological states between genders could not be evaluated. Fourthly, athletes with psychiatric illnesses may have been affected more adversely in this process, but we didn't ask the athletes if they already had a psychiatric illness. Lastly, although the present study comprises a sufficiently large sample, we had to end the participation for football due to beginning of training in the football league, and

volleyball due to the termination of the volleyball super league.

CONCLUSION

COVID-19 pandemic created new stressors on athletes' mental health. Team sports athletes' reported lower depression, anxiety and stress scores than their counterparts; whereas individual contact sports athletes reported higher stress scores than non-athletes. Social support in team sports seems to be an important coping mechanism in maintaining mental health. The psychological states of individual contact athletes should be monitored closely, and necessary psychosocial support should be provided to create coping strategies.

Ethics Committee Approval / Etik Komite Onayı

The approval for this study was obtained from Institutional Ethics Committee of Ege University, İzmir, Turkey (Decision no: 20-6T/27 Date: 10.06.2020).

Conflict of Interest / Çıkar Çatışması

The authors declared no conflicts of interest with respect to authorship and/or publication of the article.

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Author Contributions / Yazar Katkıları

Concept All authors; Design All authors; Supervision YL, SŞ, ME; Materials YL, ND, ME, GAB; Data Collection and/or Processing YL, ND, ME, GAB; Analysis and Interpretation YL, GÜB, HO; Literature Review YL, GÜB, HO, ND; Writing Manuscript YL, SŞ; Critical Reviews YL, SŞ, ME.

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