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Research Article / Araştırma Makalesi

Effects of the COVID-19 lockdown on elite volleyball athletes

COVID-19 karantinasının elit voleybol sporcuları üzerindeki etkileri

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ABSTRACT

Objective: To investigate how elite female and male volleyball players spent their time during lockdown in terms of keeping up their physical training and maintaining wellbeing as well as their beliefs, attitudes and expectation/perceptions about the upcoming season.

Materials and Methods: 331 elite volleyball players took part in the study. A survey, consisted of single and multiple-choice questions was applied. The Chi-square test was used to compare groups' frequency data. Following Chi-square test, Bonferroni correction was made and the statistical significance level was accepted as p<0.01. The significance level was set as p<0.05 for the rest of statistical analyses.

Results: 147 (44.4%) male and 184 (55.6%) female players participated in the study. The mean age was 24.8±5.0 (15-37). Female athletes (97.3%) stated that they did more physical activity than male athletes (83.7%) (p<0.001), 40.8% of male athletes thought that they could not maintain their physical condition (p: 0.043). Female players participated exercise programs designed by their conditioners more than male counterparts (p<0.001). Sleep quality which was rated as "good" decreased from 89.8% to 44.2% for male athletes, while it has been decreased from 94.6% to 37.5% for females (p<0.001 for both genders).

Conclusion: Majority of athletes had motivation to be physically active during the 9-week lockdown period. Athletes showed that they could overcome training barriers by adapting their exercises and training routines. Female volleyball players were more cautious in terms of being active and avoiding risk of infection.

Keywords: *COVID-19, volleyball, lockdown*

ÖZ

Amaç: Bu çalışmanın amacı elit kadın ve erkek voleybolcularının COVID-19 karantina sürecinde fiziksel antrenmanlarına nasıl devam ettiklerini ve iyilik hallerini nasıl koruduklarını incelemek ve gelecek sezonla ilgili düşüncelerini, tutumlarını ve beklentilerini araştırmaktı.

Gereç ve Yöntem: 331 elit voleybol sporcusu araştırmaya katıldı. Tek ve çoktan seçenekli soruların yer aldığı bir anket uygulandı. Gruplara ait frekans veriler Ki-kare testi ile karşılaştırıldı. Ki-kare testi sonrasında Bonferroni düzeltmesi yapılarak istatistiksel anlamlılık düzeyi p<0.01 olarak kabul edildi. Diğer analizlerde ise anlamlılık düzeyi p<0.05 olarak değerlendirildi.

Bulgular: Araştırmaya 147 (%44,4) erkek ve 184 (%55,6) kadın sporcu katıldı. Kadın sporcular (%97.3), erkeklere (%83.7) göre daha yüksek oranda fiziksel aktivite yaptığını söylerken (p<0.001), erkek sporcuların %40.8'inin kondisyonlarını koruyamadıklarını düşündüğü belirlendi (p:0.043). Kadın sporcularda kondisyoner tarafından planlanan egzersiz programlarına katılım daha yüksek bulundu (p<0.001). Uyku kalitesini iyi olarak değerlendirenlerin oranı erkek sporcularda %89.8'den %44.2'ye, kadınlarda ise %94.6'dan %37.5'a düşmüştü (her iki cinsiyet için p<0.001).

Sonuç: Sporcuların büyük bir bölümü 9 haftalık karantina döneminde fiziksel olarak aktif olma motivasyonuna sahiptiler. Egzersiz ve antrenman programlarını mevcut duruma uyarlayarak antrenman engellerini aşabilecekleri görüldü. Kadın sporcuların aktif kalma ve enfeksiyon riskinden korunma konusunda daha temkinli davrandıkları dikkat çekti.

Anahtar Sözcükler: *COVID-19, voleybol, karantina*

INTRODUCTION

The COVID-19 (SARS-CoV-2) pandemic had a significant impact on people's lives worldwide and elite athletes' lives were of no exception. Athletes' physical and psychological states were affected because of the lack of interaction in terms of team environment, facilities, social support and training (1). Early in March 2020, due to COVID-19, sports competition calendars started to be cancelled. Many countries banned nonessential travel and people were forbidden to leave their homes. Athletes all over the world have had to abandon their training routines.

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In Turkey, the first COVID-19 case was announced on 11 March 2020 and restrictions were enforced soon afterwards. On the 19th of March, all sports competitions at all levels were stopped. All volleyball league activities were suspended, and training facilities and other sports venues were closed. Volleyball is a popular sport in Turkey. The Turkish women's volleyball league is especially well known throughout Europe and the rest of the world. Many foreign elite volleyball athletes play in the leagues. It was uncertain when or even if leagues would start again and the future of both players and sport clubs was obscure. There was a lot of ambiguity with regards to when leagues would restart, when spectators would be allowed to return and how COVID-19 transmission risks would be managed. In volleyball, most professional league teams for both women and men were back to training in July 2020. Until this time, athletes were banned from training as a team and were not allowed to use gyms for strength training. Many articles have been published regarding the mitigation of infection, the psychological and physiological effects of lockdown on athletes, treatment strategies for athletes and their return to sport after being infected (2, 3). The resumption of sport events was a complex process; scientific evidence regarding infection was crucial to formulate guidelines for safe return. Many measures were taken to provide a safe environment for the athletes (4). Sport events eventually started taking place again. Several studies have been carried out focusing on how athletes spent their time under lockdown and what their thoughts and feelings were regarding the upcoming season (5-8). This study aims to investigate how elite female and male volleyball players, who play in best professional leagues, spent their time during lockdown in terms of keeping up their physical training and maintaining wellbeing as well as their beliefs, attitudes and perceptions about the upcoming season. This research also investigated the number of athletes who got infected and how the league calendar changed because of these COVID-19 cases.

MATERIAL and METHODS

The universe of this cross-sectional study consisted of 460 volleyball players who took part in professional league (male and female) during the 2020-2021 season. A sampling method was not applied; all athletes over 18 years old, both female and male were included in the study. A sports physician, sports physiotherapist and public health specialist developed the survey questions. Ethics approval was obtained from the Ethical Committee of Başkent University (KA20/275). A Google Form survey link was sent to all of the league team managers via mail and WhatsApp. The survey had been prepared in Turkish and English languages. Athletes were asked to read the content of the survey and click on a link to give their consent before answering the survey. The survey only took four minutes, intentionally short to appeal to more athletes. The survey was open for three days (25 June to 28 June 2020) to accept answers. 331 (73.5%) athletes completed the survey. In addition, the 2020-21 season was screened to determine how many volleyball players got infected and how the league calendar had to change. A specific regulation was applied in order to minimize infection risk. Teams were obligated to provide COVID-19 test results to the Turkish volleyball federation regularly and also prior the games. When a team had more than 3 players infected, their game was postponed until they provided negative test results. Information of infected players and postponed games were recorded by the league management department of Turkish Volleyball Federation. This data was obtained from Turkish Volleyball Federation. The survey consisted of 27 single and multiple-choice questions regarding gender, birth date and sports age as well as their training status at home during the lockdown period, thoughts on COVID-19 and expectations about the upcoming season. SPSS 22.0 package program was used for statistical analysis. Data were expressed as mean (standard deviation), median with data range minimum to maximum and number (%), as appropriate. The Kolmogorov-Smirnov Test was used to determine whether the data were normally distributed. The Mann-Whitney test was used for data that were not normally distributed. The Chi-square test was used to compare groups' frequency data. Following Chi-square test, Bonferroni correction was made and the statistical significance level was accepted as $p<0.01$. The significance level was set as $p<0.05$ for the rest of statistical analyses.

RESULTS

A total of 331 athletes; 147 (44.4%) male and 184 (55.6%) female, participated in the study. The mean age of the athletes was 24.8±5.0 (15-37), and their sport age was 13.1±4.9 (4-26). The median age of the male athletes [26 (15-37) years] was higher than the female athletes [23 (16-34)], while the median sports age for females [12.5 (4-26)] was higher than males [23 (16-34)] (p: 0.001 and p: 0.510 respectively). 91.2% of the athletes, who stated that they had stayed at home for an average of 9.9±2.9 (1-7) weeks before the date of the study, said that they did physical activity regularly.

The physical exercises that the athletes did during their time at home, in order of frequency, are: Abdominal and core exercises [244 athletes (73.7%)], calisthenics [242 athletes (73.1%)], stretching [169 athletes (51.1%)], balance and coordination exercises [91 athletes (27.5%)], aerobics (running, cycling, elliptic cycling) [89 athletes (26.9%)], yoga [87 athletes (26.3%)] and Pilates [44 athletes (13.3%)]. While the median number of weekly training sessions was 5 (1-

10), male players were training 4 (1-10) times and female players were training 5 (1-10) times per week (p<0.001). While the duration of training was <1 hour in 55.0% of the athletes, it was ≥1 hour in 45.0% of the athletes and there was no difference in terms of gender (p: 0.942). 75.5% of the athletes needed home training, while 33.8% followed an online program and 66.2% had their training program prepared by their conditioners. Considering exercise preferences in this period by gender, males both needed more training and followed more online programs than females, but there was no statistically significant difference between genders. (p: 0.159 and p: 0.681, respectively). More female athletes had their exercise programs planned by their conditioners than male athletes (p<0.001) **(Table 1**). When asked about their sleeping habits before and after COVID-19, 306 athletes (92.4%) stated that their sleeping quality was "good" before the pandemic, while the number decreased to 134 athletes (40.5%) after the pandemic started. The sleep behaviour of athletes also changed significantly in the post COVID-19 period (p<0.001). The rate of males who assessed sleep quality as "good" decreased from 89.8% to 44.2%, and for females from 94.6% to 37.5% (p<0.001 for both genders).

Table 1. Training preferences during lock down period

	Total	Male	Female	p*
Need for sport specific training				
Yes	250 (75.5)	**117 (79.6)**	133 (72.3)	0.159
No	81 (24.5)	30 (20.4)	51 (27.7)	
Online training				
Yes	112 (33.8)	52 (35.4)	60 (32.6)	0.681
No	219 (66.2)	95 (64.6)	124 (67.4)	
Who planned training programme				
The athlete herself/ himself	88 (26.6)	54 (36.7)	34 (18.5)	
Team coach	24 (7.3)	15 (10.2)	9 (4.9)	**<0.001**
Physical trainer	219 (66.2)	78 (53.1)	141 (76.6)	

*Chi-squared test

Athletes' opinions about the time spent at home are given in **Table 2.** Accordingly, while female athletes (97.3%) stated that they did more physical activity than male athletes (83.7%) (p<0.001), 40.8% of male athletes thought that they could not maintain their physical condition (p: 0.043).

Table 2. Athletes' responses related to lockdown period

Questions	Answers	Total	Gender		p*
			Male n (%)	Female n (%)	
Did you do physical activity regularly?	Yes	302 (91.2)	123 (83.7)	179 (97.3)	**<0.001**
	No	29 (8.8)	24 (16.3)	5 (2.7)	
Do you think that you were able to maintain your physical condition during lockdown?	Yes	108 (32.6)	43 (29.3)	65 (35.3)	**0.043**
	No	111 (33.6)	60 (40.8)	51 (27.7)	
	No idea	112 (33.8)	44 (29.9)	68 (37.0)	
Do you think that you did sufficient strength training during lockdown?	Yes	62 (18.7)	31 (21.1)	31 (16.8)	0.612
	No	203 (61.3)	88 (59.9)	115 (62.5)	
	No idea	66 (19.9)	28 (19.0)	38 (20.7)	
Did you struggle to be motivated to keep exercising during lockdown?	Yes	134 (40.5)	60 (40.8)	74 (40.2)	0.074
	No	50 (15.1)	29 (19.7)	21 (11.4)	
	Sometimes	147 (44.4)	58 (39.5)	89 (48.4)	
Has COVID-19 caused financial loss for you?	Yes	192 (58.0)	86 (58.5)	106 (57.6)	0.959
	No	139 (42.0)	61 (41.5)	78 (42.4)	

* Chi-squared test

Athletes' answers to the questions about the measures against COVID-19 are given in **Table 3.** While 42.6% of the athletes wanted spectators to be present at the matches, when evaluated in terms of gender, the demand for spectators was statistically significantly higher for male athletes than for female counterparts (p<0.05). While male players' anxiety about the start of the season was significantly less than females'(p<0.001), more male athletes believed that the league would start in September, although the difference was not statistically significant (p: 0.594). 74.9% of all athletes were anxious about catching COVID-19, yet this rate was statistically significantly higher for female athletes than for males (p<0.001).

Table 3. Responses related with measures against COVID-19

Questions	Answers	Total	Gender		p*
			Male n (%)	Female n (%)	
When the league starts would you prefer to play games with spectators?	Yes	141 (42.6)	76 (51.7)	65 (35.3)	**0.010**
	No	75 (22.7)	30 (20.4)	45 (24.5)	
	No idea	115 (34.7)	41 (27.9)	74 (40.2)	
Do you think that the league will start in September 2020?	Yes	168 (50.8)	77 (52.4)	91 (49.5)	0.594
	No	55 (16.6)	21 (14.3)	34 (18.5)	
	No idea	108 (32.6)	49 (33.3)	59 (32.1)	
Are you anxious about the league starting?	Yes	78 (23.6)	29 (19.7)	49 (26.6)	**<0.001**
	No	184 (55.6)	102 (69.4)	82 (44.6)	
	No idea	69 (20.8)	16 (10.9)	53 (28.8)	
Do you believe that preventative measures taken during training sessions and games will protect you from COVID-19?	Yes	139 (42.0)	77 (52.4)	62 (33.7)	**0.003**
	No	95 (28.7)	34 (23.1)	61 (33.2)	
	No idea	97 (29.3)	36 (24.5)	61 (33.2)	
Do you believe that you need to take the measures related to COVID-19 seriously?	Yes	324 (97.9)	142 (96.6)	182 (98.9)	0.285
	No	7 (2.1)	5 (3.4)	2 (1.1)	
Do you think your teammates will take the measures related to COVID-19 seriously?	Yes	218 (65.9)	100 (68.0)	118 (64.1)	0.759
	No	29 (8.8)	12 (8.2)	17 (9.2)	
	No idea	84 (25.4)	35 (23.8)	49 (26.6)	
Do you think your coach will take the measures related to COVID-19 seriously?	Yes	280 (84.6)	123 (83.7)	157 (85.3)	0.244
	No	10 (3.0)	7 (4.7)	3 (1.6)	
	No idea	41 (12.4)	17 (11.6)	24 (13.1)	
Are you worried that you may get infected with COVID-19?	Yes	248 (74.9)	97 (66.0)	151 (82.1)	**<0.001**
	No	44 (13.3)	32 (21.8)	12 (6.5)	
	No idea	39 (11.8)	18 (12.2)	21 (11.4)	

* Chi-squared test

According to the rules set by the Turkish Volleyball Federation, if at least 3 athletes in a team were positive in the COVID-19 tests performed before each match, the match was postponed and played later. Throughout the season, a total of 28 (19.7%) matches for women and 56 (39.4%) matches for men were postponed for these reasons. 5 teams' matches were postponed in the first half of the women's league, and 6 teams' matches in the second half. The 6 teams that had their matches postponed in the second half were all different teams from those in the first half (16 teams in total). In the men's league, 9 teams in the first half and 11 teams in the second half had their matches postponed (16 teams in total). 8 of the teams in the men's league that had their matches postponed in the second half, had also had their matches postponed in the first half. In the COVID-19 PCR test scans conducted during the season, 81 (44%) female athletes were infected once and 4 (2.1%) athletes twice. In men, 85 (57.8%) athletes were infected once and 25 (17%) athletes twice. Men's rate of being infected with COVID-19 was detected to be higher (p<0.001) (**Table 4**).

Table 4. Number of COVID-19 cases in study group

	Total	Gender		p*
		Male n (%)	Female n (%)	
Athletes presented positive COVID-19	166 (50.1)	85 (57.8)	81 (44)	**<0.001**
Athletes NOT presented positive COVID-19	165 (49.9)	62 (42.2)	103 (55.9)	

* Chi-squared test

DISCUSSION

The purpose of the study was to assess the effect of the lockdown period due to adjustments in training routines, changes in the volleyball league calendar, lack of contact with teammates and general uncertainty on athletes' perceptions concerning the upcoming season and their physical, general wellbeing and social status.

Findings from previous studies showed that COVID-19 had a strong impact on the training routines, stress, social and psychological states of athletes (5, 9, 10). It was also stated that team athletes who had more interaction with team members and felt supported during the pandemic reported greater psychological wellbeing (11). In the current study it can easily be stated that volleyball players continued to be physically active during lockdown. The majority of the athletes, especially females had support from their sports clubs. Training programmes were provided for female athletes mainly by their physical trainers. This shows that despite uncertainty about the upcoming season, sport clubs tried to help improve athletes' physical and psychological status and promote interaction between team members. The majority of these athletes stated that they did body weight exercises, abdominal and core workouts. These exercises are easy to do indoors and require less space and equipment. Male athletes stated that the training during the lockdown period was inadequate. Likewise, results showed that they had less support from their sport clubs compared to female athletes. Support from sport clubs was seemed to be helpful during the lockdown period, at least psychologi–

cally. Distance from team members, athletic community and coaches as well as the lack of social support might also have affected male athletes' perception about the level of training they performed. It was also stated that solo training and nonspecific training might be challenging for team athletes (5).

Exercise has a positive effect on sleep quality; however, our results indicate that athletes were different from non-athletes during the lockdown period (12, 13). Our study revealed that athletes of both genders were active and did exercise during the lockdown but when sleep behaviour was questioned, both genders stated that it went from good to bad. A standard sleep quality questionnaire was not used in this study due to our attempt to keep the survey short, as mentioned in the methods section. However, we believe that questioning sleep behaviour before and during the lockdown was a clear-cut question for athletes. Therefore, sleep behaviour was screened using poor to excellent scale. Recent studies had similar findings regarding decreased sleep quality in athletes during lockdown periods (14, 15).

The COVID-19 pandemic was an unprecedented situation; there were no data in terms of predicting infection rates between athletes. Recommendations were published about how to mitigate the risk of infection during training sessions and games. Countries and governing sports bodies have also taken measures to support participation in sport (16, 17). When we questioned the volleyball players about infection concerns, female volleyball players were found to be more concerned than male counterparts and male players were more willing to have spectators at the games. This result was in line with previous studies that also found female athletes or non-athlete females' negative emotions in stressful situations were higher than males' (9, 18, 19) When we compare the number of games postponed because of infection and the number of athletes who tested positive during the whole season, it can be clearly seen that infection rates were higher in males. According to the literature, males and females have equivalent risks of infection (20). This study's results show the opposite, for which there might be diverse reasons. However, physiologic and genetic factors are beyond the scope of this study. In line with male athletes' responses, they might have underestimated infection risk and not paid enough attention to protection rules. Future studies should focus on athletes' behaviours, beliefs and team training environments to control risks. Guidelines might be re-formulated according to these studies.

One of the limitations of this study is that the participants were not screened to determine whether or not they had COVID-19 during lockdown. Having COVID-19, waiting for results or being in quarantine could have affected the results. The other limitation is that the survey was done only once during the last week of the lockdown period. Another limitation of this study is that we did not assess the depression and anxiety of the athletes. However, we did not have any data regarding these indicators before the lockdown. It would be more useful if we could have monitored these indicators before the lockdown as well. We can say that there is no sampling bias since this study included an equal proportion of men and women and 73.5% of the universe (all volleyball athletes in the top Turkish leagues) participated in the study.

CONCLUSION

The COVID-19 had and will continue to have impact on people's as well as on athletes' lives. End of the pandemic is obscure, besides other infectious situations may occur in the future and lead to similar restrictions. Our study highlighted some of the impacts of lockdown on elite level volleyball players. Majority of athletes had motivation to be physically active during the 9-week lockdown period. Athletes showed that they could overcome training barriers by adapting their exercises and training routines. Female volleyball players were more cautious in terms of being active and avoiding risk of infection. Specific strategies would be beneficial in lockdown situations, such as online consultations for planning training sessions at home on individual basis and providing psychological support.

Ethics Committee Approval / Etik Komite Onayı

Approval for this study was obtained from the Institutional Ethics Committee of Başkent University, Türkiye (Decision No: KA20/275, Date:27.06.2020)

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 SK; Design: SK, SBU; Supervision: SK; Materials SBU; Data Collection and/or Processing SBU, ED; Analyses and Interpretation HNA; Literature Review SBU; Writing Manuscript SK, SBU; Critical Reviews SK

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