Latest updates on SARS-CoV-2 (Corona Virus)

Chapter 3

How has COVID-19 Modified Training and Mood in Professional and Non-Professional Football Players?

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Abstract

Background: Coronavirus disease 2019 (COVID-19) has restricted freedom of movement with several countries 'locked down' worldwide. During this isolation period or quarantine, habits have been modified. This might have had negative effects on physiological variables but also influenced numerous emotional aspects, especially in elite athletes, which can have a negative impact on training and sleep quality, affecting their performance.

Methods: 175 Spanish professional and non-professional association football players answered an online survey about demographic and training habits, as well as two validated questionnaires to assess psychological variables (POMS and WLEIS-S).

Results: The results showed that the confinement period reduced the load of training ($p< 0.01$), and modified the sleeping behaviour (both, sleep time ($p< 0.05$) and quality ($p< 0.001$)) across soccer players. Higher emotional intelligence (EI) values were positively related to training variables and strongly correlated with the mood. Interestingly, athletes' mood was affected differently depending on gender.

Conclusion: We found that confinement period affects both, training load and recovery process and that mood states and EI could predict the training variables and performance of top-level football players.

Keyword: Soccer; behaviour; POMS; emotional intelligence; performance.

1. Introduction

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). During the first months of 2020, the virus spread rapidly, forcing many countries to impose a quarantine status and confinement in which freedom of movement was restricted. In Spain, a state of alarm was declared on 15 March, reaching a peak of infections in mid-April [1]. The last official match of the Spanish association football league was played on 8 March, with the last European League game occurring on 11 March. Football players began an isolation period in their homes modifying their regular training sessions.

Football is a sport of interaction between players (collaboration-opposition), so training without other players would be largely out of context and far removed from the demands of real competition [2]. Insufficient and unspecific stimulus could lead to a partial or complete loss of adaptation induced by training. During confinement it remains essential to control the training load to ensure optimal levels of volume and intensity [3].

For this reason, football players have been provided with different strategies, both for training and recovery, to reduce the negative impact of the confinement period on their fitness and endurance capacity. Training sessions combining multi-vector strength exercises involving eccentric contraction with a high speed of execution [4] and High Intensity Interval Training (HIIT) seems to be efficient to maintain physical fitness [5].

Tools such as individual questionnaires could be used to control the *rated perceived exertion* (RPE) or wellness [6-8]. Thus, the RPE can be used not only to measure exercise intensity but also the training monotony index which is related to overtraining when high monotony rates are combined with isolate high loads[9]. The length of this unusual period without training or competition could also have a major effect on the players' emotional or mental states [6]. For this reason, it is crucial to evaluate changes in players' mental and psychological status during confinement periods [10]. Many studies have described negative changes in mood, quality and sleep hours, and anxiety during such periods. Variables including total duration of confinement, fear of contagion, frustration, boredom, and over-information could be predictors of stress [11].

Another important psychological aspect is emotional intelligence (EI), which involves the ability to recognize one's own and other people's feelings and emotions and being able to

use this information to guide ideas and actions [12]. In the sports field, EI has been shown to be a possible predictor of sports performance [13]. Different studies have pointed out that the people with greater EI values were more motivated to train [14] and that EI depends on gender [15]. Castro-Sánchez*, et al.* [16] have shown that EI could determine some athletes' moods, including anxiety and consequently performance.

Quarantine not only has had negative effects on physiological variables but also influenced numerous emotional aspects, which can have a negative impact on training and sleep quality. However, all studies about this period of confinement have been directed towards a description of mood separate from the context of sports performance or professional athletes. We hypothesized that the confinement period affected the training load as well as sleeping patterns in professional football players and that training could be influenced by mood state and EI. Accordingly, the main objective of the study was to analyse the effects of COVID-19 confinement on training variables (RPE, training days and hours) and sleep (quantity and quality) and sought to establish the relationship between emotional aspects (moods and EI) and training (load and recovery) based on gender and competitive level.

2. Methods

2.1. Participants

The participants inclusion criteria were that all football players must be federated by the *Real Federación Española de Fútbol* and playing this season in one of their national leagues. A total of 210 football players questionnaires were collected. Surveys of injured athletes (*n* = 22) and athletes not resident in Spain (*n* =13) were excluded from the study. The final participants in the study were*n* = 175 football players (150 men and 25 women). The gender sample distribution of football players in Spain was men (93.5%) and women (6.5%) in 2019 while in our study was men (85.7%) and women (14.3%). Consequently, our sample ratio by gender could be considered optimal [17].Men were 25.89 ± 5.23 years old and had been confined 29.68 ± 2.18 days. Women were 24.32 ± 4.55 years old and had been confined 28.61 ± 0.97 days. Of the respondents, 11 men and 13 women players had been called up by their national teams in the last two years. No players were infected with COVID-19 and only one man (0.6%) had recovered from COVID-19 during the survey period. Football players were divided into two categories: professionals (in the Professional Soccer League [LFP], both *LaLiga* and*LaLiga Smartbank* for men and *Liga Iberdrola* for women) and non-professionals (remaining national leagues). Descriptive variables of play position, sport level, mood states, and EI variables are shown in **Table 1**.

Table 1: Descriptive variables of the soccer players by gender.

	MEN		WOMEN	
Category / Sport level	***N***	***%***	***N***	***%***
International leagues	13	8.70		
First male division (LaLiga) / First female division (Liga Iberdrola)	2	1.30	15	60.00
Second male division (LaLiga Smartbank) / First female division B (Reto Iberdrola)	22	14.70	6	24.00
Second male division B/ First national female division	40	22.00	4	16.00
Third male division	81	45.30		
First regional male division or lesser	12	8.00		
Play position	***N***	***%***	***N***	***%***
Goalkeeper	15	10.00	1	4.00
Outside defender	27	18.00	6	24.00
Central defender	24	16.00	6	24.00
Midfielder	31	20.70	7	28.00
Offensive midfielder	11	7.30	1	4.00
Winger	24	16.00	2	8.00
Striker	18	12.00	2	8.00
Mood State	***M***	***SD***	***M***	***SD***
Tension-Anxiety	7.70	3.85	8.64	4.05
Depression-Dejection	4.87	3.15	4.76	3.09
Anger-Hostility	5.30	3.60	5.96	3.17
Vigour-Activity	13.91	3.19	13.12	3.27
Fatigue-Inertia	5.99	3.46	7.20	3.03
Friendliness	15.39	2.95	16.40	2.10
Emotional Intelligence	***M***	***SD***	***M***	***SD***
Self-Emotion Appraisal	5.88	0.76	5.87	0.86
Other´s Emotion Appraisal	5.24	0.78	5.48	0.97
Use of Emotion	5.81	0.93	5.77	0.97
Regulation of Emotion	5.28	1.04	5.11	0.90

Notes: *N* = number of paticipants; *M* = mean; *SD* = standard deviation.

2.2. The instrument

The demographic and training questionnaire design was carried out by two professional coaches with wide international experience independently. Later, both questionnaires were discussed by the two researchers, who developed an initial version of the combined questionnaire. This version was tested in a pilot study involving four players (two men and two women) and their feedback was used to revise and modify the survey by a third external sports expert. The definitive version was prepared by consensus among the three experts. The Spanish validated versions of the Profile of Mood States (POMS)[18]and the Wong Law

Emotional Intelligence Scale Short form (WLEIS-S)[19]were used to measure mood state and EI, respectively. Accordingly, the final version of the questionnaire was structured as follows: demographic (Q1-10, single choice type), training (Q11-20, mixed single choice and Likert scale types), and psychological variables [WLEIS-S (Q21-36, Likert scale type) and POMS (Q37-67, Likert scale type)]. The total number of questionnaire items were 67. In contrast, the approximate time to complete the questionnaire was 5 minutes. For more details about each area and response rates see sections2.3 methodology and 2.4 variables.

2.3. Methodology

The final version of the survey was written in a Google forms questionnaire and was sent to 132 personal contacts of footballers and 11to technical staff, so the coaches and the physical trainers will forward it to their teams using the snowball sampling technique [20]. Two days after sending the questionnaire invitations a follow-up was sent to increase the response rate [21]. The hypothetical maximum number of responses associated with the invitations sent was 377 and the final number of registered surveys was 210, so the minimum estimated response rate was 55,70%. According to the previous literature our estimated response rate could be considered appropriate-good[21,22]. Nevertheless, since it is not possible to know the exact response rate, there are still convincing reasons to consider a very good data set the actual responses from 175 Spanish players [23]. All the survey invitations and the follow ups were sent via WhatsApp.

The questionnaire was available online for one week just four weeks after the state of alarm was declared in Spain [1], from 12 April 2020 to 19 April 2020.After these dates, no surveys were accepted. These dates were selected due to the special situation of Spain, which at that time had the second highest total number of cases of COVID-19 infection[24].

As an essential requirement, before completing the survey, all participants signed an informed consent form. The questionnaire was open and anonymous to verify the sincerity of the answers. Unlimited time to fill the survey was provided to all athletes.

2.4. Variables

The study variables were distributed in three areas: demographic (Q1-10), training (Q11-20),and psychological variables [WLEIS-S (Q21-36) and POMS (Q37-67)]. Thedemographic variables were age (years); gender (male or female); number of days confined (days);residence (Spain or other country); sport level (league); selected by the national team in the last two years (yes or no); play position; injured (yes or no); education level (eight levels from less than 5 years of schooling to PhD.) and personal relationship with the COVID-19 (no relation, COVID-19 infected, or COVID-19 recovered). All the training variables were referred to both, the pre and during COVID-19 lockdown conditions. Pre-isolation data could be considered as

"normal" training values. Thetraining variables were volume (training days and training hours per week); intensity (RPE, Likert scale 1–10); and recovery (sleep hours and sleep quality, Likert scale 1–10). All the psychological variables were referred to the COVID-19 lockdown conditions. Thepsychological variables and our study Cronbach's alpha reliability values were: mood state (tension-anxiety (α = .76), depression-dejection (α = .71), anger-hostility (α = .82), vigour-activity (α = .81), fatigue-inertia (α = .79), and friendliness (α = .78)) [18] and EI, includingself-emotion appraisal (SEA) (α = .81),other's emotion appraisal (OEA) (α = .70), use of emotion (UOE) (α = .81), and regulation of emotion (ROE) (α = .84)[19].

2.5. Data analysis

The data are described by arithmetic mean (*M*) and standard deviation (*SD*). The normal distribution of the variables was checked using Kolmogorov-Smirnov and Shapiro-Wilk tests. All variables were distributed normally. Paired sample *t*-test were used to compare pre isolation and isolation periods and independent sample *t*-test were performed to compare gender differences. When statistically significant differences were found, the effect size was estimated using the Cohen's *d* index (*d*) [25], establishing two cut-off points: medium effect (0.30)[26] and large effect (0.60)[27]. The confidence interval was set at 95% for the effect size. Analysis of variance (ANOVA) of one factor was performed when three groups or more were contrasted. To set the differences between groups, post-hoc analysis was carried out using the Tukey test. Moreover, Pearson correlations were used to describe the relationships between psychological and training variables. IBM SPSS Statistics software (Version 25.0. IBM Cor) was used to make the mathematical calculations. The level of significance was set at $P<0.05$.

3. Results

Comparisons between gender showed the following results: men slept more hours before the isolation period than women, $T_{(173)}$ =2.41; P = 0.17; men had better sleep quality than women during the isolation period, $T_{(173)}$ =2.82; P = 0.005; women scored higher than men in the friendship mood state during the isolation period, $T_{(173)}$ =2.09; P = 0.043; women had a higher education level than men, $T_{(173)}$ =2.11; P = 0.037;women had a higher proportion of professional players than men $T_{(173)}$ = 9.39; $P< 0.001$; women had a greater number of players called up by their national team in the last two years than men $T_{(173)}$ = 4.57; $P< 0.001$.

Regarding the comparison between periods before and during isolation, the following results were found (Table 2). In men, RPE ($P<0.001$),training days(P = 0.016), training hours ($P<0.001$), and sleep quality ($P<0.001$) were reduced with Cohen's *d* values between 0.25–0.83. However, the sleep hours increased (P = 0.02; d = 0.22). In women, both training hours ($P<0.001$; d = 0.79) and sleep quality ($P<0.001$; d = 1.06) were reduced during the isolation period;for the remaining training variables, $P>0.05$.

Table 2: Training variables comparison between previous and during isolation periods by gender.

		PRE-Isolation		Isolation period				Cohen's *d*		Interval confidence 95%	
		M	*SD*	*M*	*SD*	*R*	*P*	*D*	*D* pooled	*LL*	*UL*
ALL	RPE	6.06	2.82	4.71	2.39	0.70	< 0.001	-0.618	-0.67	-0.4	-0.83
	Tdays	5.18	1.05	4.91	1.43	0.53	0.004	-0.27	-0.22	-0.06	-0.48
	Thours	10.82	4.87	7.26	4.38	0.60	< 0.001	-0.82	-0.86	-0.6	-1.04
	Shours	7.69	0.93	7.92	1.16	0.33	0.014	0.21	0.19	0.01	0.42
	Squality	6.73	2.40	5.65	2.59	0.61	< 0.001	-0.51	-0.49	-0.3	-0.72
MEN	RPE	6.09	2.83	4.64	2.31	0.72	< 0.001	-0.68	-0.75	-0.45	-0.92
	Tdays	5.16	1.00	4.91	1.44	0.50	0.016	-0.25	-0.20	-0.03	-0.48
	Thours	10.63	4.85	7.03	4.38	0.60	< 0.001	-0.83	-0.87	-0.59	-1.06
	Shours	7.76	0.91	7.99	1.14	0.35	0.020	0.22	0.19	0.01	0.45
	Squality	6.75	2.38	5.87	2.57	0.61	< 0.001	-0.42	-0.40	-0.19	-0.65
WOMEN	RPE	5.88	2.79	5.12	2.82	0.64	0.124				
	Tdays	5.32	1.28	4.92	1.38	0.67	0.076				
	Thours	12.00	4.87	8.64	4.21	0.62	< 0.001	-0.79	-0.85	-0.56	-1.03
	Shours	7.28	0.98	7.52	1.23	0.12	0.425				
	Squality	6.60	2.58	4.32	2.30	0.65	< 0.001	-1.06	-1.11	-0.81	-1.30

Notes: RPE = perceived rate exertion; Tdays = training days; Thours = training hours; Shours = sleep hours; Squality = sleep quality; *M* = mean; *SD* = Standard deviation; *R* = correlation level; *P* =level of significance; *D* = Cohen's d effect; LL = Lower limit; UL = Upper limit.

The analysis by category and sport level reported differences for men in training days $F_{(4,149)} = 4.20$ ($P = 0.003$) and training hours $F_{(4,149)} = 5.99$ ($P<0.001$). Post-hoc analysis revealed differences in training days between professional players (*LaLiga* and *Laliga Smartbank*) and the first regional male division and international league players $P<0.05$ and differences in training hours between professional players and other players $P<0.05$;for the remaining comparisons,$P >0.05$. On the other hand, significant differences were found in confinement RPE $F_{(2,24)} = 7.38$ ($P = 0.004$) and in training days $F_{(2,24)} = 4.89$ ($P = 0.017$) in women. Post-hoc analysis also revealed differences in confinement RPE and training days between first division and second division female players $P<0.05$; for the remaining comparisons,$P>0.05$. See table 3.

Table 3: Category / sport level differences in training variables by gender.

	Category / Sport level	RPE		Training days		Training hours		Sleep hours		Sleep quality	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
MEN	Professional players	5.21	2.02	5.63	0.71	10.71	6.87	7.96	1.12	6.04	2.14
	Second male division B	4.82	2.24	5.03	1.26	**5.94**[b]	2.85	8.06	1.27	5.79	2.87
	Third male division	4.75	2.48	4.91	1.53	**6.66**[b]	3.84	7.94	1.17	5.88	2.70
	First regional male division or lesser	3.17	1.99	**3.92**[a]	1.38	**5.58**[b]	2.31	8.08	1.08	6.33	2.64
	International leagues	3.92	1.89	4.15	1.72	**6.31**[b]	2.21	8.00	0.71	5.23	1.96
	Total men	4.64	2.31	4.91	1.44	7.03	4.38	7.99	1.14	5.87	2.57

WOMEN	First female division (Liga Iberdrola)	6.53	2.33	5.53	0.64	9.20	4.21	7.33	1.23	4.73	2.15
	First female division B (Reto Iberdrola)	**2.67**[c]	2.25	**4.00**[d]	2.00	8.17	5.00	7.17	1.17	2.50	2.26
	First national female division	3.50	2.08	4.00	1.41	7.25	3.59	8.75	0.50	5.50	1.73
	Total women	5.12	2.82	4.92	1.38	8.64	4.21	7.52	1.23	4.32	2.30

NOTES: a = significance differences with men professionals' players in training days; b = significance differences with men professionals' players in training hours; c = significance differences with Liga Iberdrola women players in RPE; d = significance differences with Liga Iberdrola women players in training days. Significant differences are in bold letters.

Correlations were found between training variables (RPE, T_{days}, T_{hours}, S_{hours}, and $S_{quality}$) and the mood state (POMS) in men, which ranged from $R = 0.15$ ($P<0.05$) to $R = 0.37$ ($P<0.001$), as well as correlations with EI, which oscillated from $R = 0.14$ ($P<0.05$) to $R = 0.30$ ($P<0.01$). In women, correlations were found between training variables (RPE, T_{days}, T_{hours}, S_{hours}, and $S_{quality}$) and mood state (POMS), which ranged from $R = 0.47$ ($P<0.01$) to $R = 0.55$ ($P<0.01$), as well as correlations with EI, which oscillated from $R = 0.46$ ($P<0.01$) to $R = 0.65$ ($P<0.001$). The remaining correlations are shown in **Table 4.**

Table 4: correlations between training variables, mood state and emotional intelligence by gender.

						POMS						WLEIS			
	RPE	Tdays	Thours	Shours	Squality	T-A	D-D	A-H	V-A	F-I	F	SEA	OEA	UOE	ROE
RPE		**.49*****	.13	.05	**.41*****	-.11	-.13	**-.16***	.13	-.04	.03	**.30****	.04	.11	-.03
Tdays	**.46****		**.40*****	-.06	**.35*****	-.12	-.13	-.11	**.15***	-.04	.07	.10	-.06	**.18***	-.02
Thours	.11	**.42***		-.06	.15*	.10	-.05	.04	.10	-.04	.10	.07	-.04	**.18***	-.06
Shours	.16	-.05	.04		**.39*****	-.07	.03	-.04	**.17***	-.06	.01	-.01	**-.14***	.02	-.06
Squality	**.53****	**.35***	.26	**.37***		**-.28*****	**-.31*****	**-.36*****	**.37*****	**-.32*****	**.18***	**.19****	-.05	.12	**.18***
T-A	.04	-.08	.22	.24	-.05		**.52*****	**.64*****	-.08	**.44*****	-.12	**-.33*****	-.06	**-.14***	**-.46*****
D-D	.26	-.07	.04	**.49****	.06	.26		**.63*****	**-.42*****	**.55*****	**-.29*****	**-.40*****	-.06	**-.25****	**-.34*****
A-H	.15	-.12	.21	**.55****	.05	**.50****	**.58****		**-.42*****	**.59*****	**-.41*****	**-.37*****	-.11	**-.20****	**-.48*****
V-A	-.13	.19	.19	-.28	-.07	.17	**-.46***	**-.35***		**-.45*****	**.61*****	**.33*****	.13	**.30*****	**.23*****
F-I	**.48****	.10	.27	**.50****	.27	**.51****	**.73*****	**.56****	-.21		**-.24****	**-.30*****	-.13	**-.32*****	**-.38*****
F	.12	.24	-.06	**-.47****	-.22	-.03	**-.42***	-.30	**.48****	-.19		**.34*****	**.30*****	**.36*****	**.37*****
SEA	.25	**.46****	.28	-.13	-.05	**-.42***	-.03	-.03	-.18	.05	.23		**.25****	**.49*****	**.48*****
OEA	**.49****	**.65*****	.12	.25	.33	.23	.13	.00	.33	.25	.05	.08		**.24****	**.15***
UOE	.27	**.54****	.09	.03	.22	-.26	-.12	-.19	.22	.13	.07	**.56****	**.53****		**.34*****
ROE	**.54****	.01	-.04	-.06	.28	**-.45***	-.12	-.24	-.08	-0.01	.24	.20	-.03	.11	

Notes: Men's results are showed in the upper right corner; Women's results are showed in the lower left corner; Abbreviations: RPE = rate perceived exertion; Tdays = training days per week; Thours = Training hours per week; Shours = sleep hours per day;Squality = sleep quality; T-A = Tension-Anxiety; D-D = Depression-Dejection; A-H = Anger-Hostility; V-A = Vigor-Activity; F-I = Fatigue-Inertia; F = Friendliness; SEA = Self-Emotion Appraisal; OEA = Other´s Emotion Appraisal; UOE = Use of Emotion; ROE = Regulation of Emotion; Significant correlations are in bold letters. * $p< 0.05$; ** $p< 0.01$; *** $p< 0.001$

4. Discussion

This study has analysed training load (RPE and volume) and recovery (sleep quantity and quality) differences before and during COVID-19 isolation periods and the possible influence of moods and EI on training under lock-down conditions. The main findings were that the COVID-19 isolation period reduced the duration (days and hours) and intensity of training, and sleep quality, while the number of sleep hours increased for the respondent football players.

But for low training hours and sleep quality reported by female players, no gender-related differences emerged for the other experimental variables. However, these results were different based on athletic level. Men professional players (LFP footballers), trained more days and hours, with greater RPE values than the semi-professional and amateur players.This fact could be due to the club economic and organizational resources (facilities, sport staff…) and the exclusive dedication and a higher salary of professional players since they have an interprofessional minimum wage.On the other hand, women professional players – footballers of the first Spanish division (*Liga Iberdrola*) – trained with more RPE than players of the second Spanish division (*Reto Iberdrola*). Moreover, RPE values were lower during confinement in men with a great effect size ($d = -0.68$;$P<0.001$). This decrease could be due to the absence of interaction and collaboration-opposition situations between players, which would entail less difficulty of the actions and the loss of training specificity [2]and due to higher monotony rates combined with isolate loads [9].In the same line, lack of specificity during the confinement period [4]could be due to the different spaces and materials available to the football players. However, RPE was more affected in women than in men by mood, especially for fatigue, which could explain an inverse relationship for up to 23% of the variance in women.

These data are in line with previous studieswhichshoweda similar number of training days (5.16 vs. 5). However, our training volume was higher in terms of hours (10.63 vs. 7.5) [7]. This difference could be explained because of the sample size, the season period, and sports level. As expected, the training volumes were dramatically reduced during confinement. This behaviour change does not seem to be exclusive to football players,as populations of young people have also reduced their levels of physical activity during COVID-19 confinement [28].

Regarding the football players' recovery, the sleep quality worsened in both men and women $P<0.001$ with the following effect sizes and percentages, $d =0.42$ (−13.04%) and $d = 1.06$ (−34.55%), respectively. Further analysis revealed that men'ssleep qualitywas affected not only for training factors such as RPE, training days, and training hours, but also by all mood states (tension, depression, anger, vigour, fatigue, and friendliness) during confinement with r values that ranged from $r = .18$ to .37. Surprisingly, mood states (depression, anger, fatigue, and friendliness) did not affect the quality of sleep,but affected the sleep hours in

women with *r* values that ranged from *r* = .47 to .55. These changes could be associated with aspects such as frustration, fear of contagion, and boredom, which could generate stressand thus make sleep worse [11]. Another cause could be the absence of group competition and training, which could have a significant impact on the players'emotional state [6].

As previously observed, moods have influenced various aspects of football players' lives during the isolation period, andmoods are important factors for performance even in normal sports situations for both men and women [29]. In the same line,physical activity could be recommended to reduce the negative emotional effect in periods of confinement [30]. We have also shown higher correlation levels in women than in men between moods and training variables. Our resultstherefore would be in agreement with the previous literature which showed gender differences.Previous studieshave shownhigher levels of the vigour emotional state [31] and a negative perception in neuroticism, psychological inflexibility and sports performance incidence in women under COVID-19 crisis[32].

Another important aspect revealed in this study was the relation between training and EI. Previous studies have showed that EI could be a predictor of sports performance [13]. Our data indicate that SEA influenced RPE in men ($R^2 = 0.09$;$p<0.01$), while in women it influenced the number of training days ($R^2 = 0.21$;$p<0.01$). Surprisingly, linear regression revealed that the number of training days was determined by SEA and OEA ($R^2 = 0.60$;$p<0.001$) in women,highlighting the importance of EI. These results are in line with the study of Saw*, et al.* [33],which related the training load with subjective well-being in football players,establishing how subjective emotional measures responded to changes induced in training. Emotionally smarter people are also more motivated to be physically active. Thus, high levels of EI have been associated with pleasurable emotions by practising physical activity [14].

Lastly, our study detected how EI is directly related to all training components in men and RPE and training days in women, with higher correlations in women than in men. Multiple relationships were found between EI and mood states, both in men and women. In this line, certain levels of EI could act preventively against states of anxiety in athletes, thus improving performance [16].

Although the literature is scarce regarding football and isolation periods like COVID-19 and our study has a large sample witha nice proportion in gender (14.28%for our study vs. 6.12% Spain)[17], some limitations should be mentioned. The main limitation lies in the limited statistical power as a consequence of the small sample of women for categorical analyses.Moreover, additional data of mood states and EI during pre-isolation period would improve the pre and isolation analysis. More control of the material and the athletes' houses would also improve the analysis. For this reason, results should be interpreted with caution. Future studies analysing performance changes based on different training programmes and the

use of support materials could improve current knowledge.

4.1. Practical applications

Some practical applications can be extracted from our study. Return to trainings should be controlled due to the possible performance losses caused by the COVID-19 isolation period and the absence of sports interaction [34]. Accordingly, safe conditions and a rigorous control system must be established by federations and institutions to protect the integrity of the football sport [35].In the same line,maintaining certain levels of physical activity during confinement could improve the athletes' quality of life [30]. In addition, some specific programs to support football players at psychological level could be recommended, specially to improve psychological flexibility and coping [32].

5. Conclusions

As far as the authors know, this is the first study of football players during COVID-19 that establishes differences by gender and sporting level. The confinement period has influenced the days, hours, and intensity of training. However, this isolation period has not affected men and women equally. In the case of men, it seems to have increased the sleep hours and decreased the training days, training hours, RPE, and sleep quality, while in women, it has reduced the training hours and sleep quality. Regarding the sports level of the football players, male professional football players have trained more days and hours than non-professional players. Female professional football players have, however, trained with more intensity and for more days compared to non-professional ones.

The present study indicate that mood states can affect sleep quality, sleep hours, and RPE in both men and women. We havealso shown that EI is related to all training components in men and to RPE and days of training in women. Specifically, lower EI values can negatively impact training days and intensity for both genders. Consequently, moods and EI can affect training variables and the performance of top-level football players.

6. Acknowledgments: Thank you to all football players who filled the questionnaire.

7. References

1. BOE. Estado de alarma. Real Decreto 463/2020. Ministerio de la presidencia.: Spain, 2020.

2. Martín-Barrero, A.; Martínez-Cabrera, F.I. Game models in soccer. From theoretical conception to practical design. Retos 2019, 36, 543-551.

3. Gabbett, T.J.; Whyte, D.G.; Hartwig, T.B.; Wescombe, H.; Naughton, G.A. The relationship between workloads, physical performance, injury and illness in adolescent male football players. Sports Medicine 2014, 44, 989-1003.

4.Domínguez, E.; Arjol, J.; Crespo, R.; Fernández, C. Regreso al entrenamiento y la competición en el fútbol profesional después de la alerta sanitaria del covid-19 con énfasis en los efectos del confinamiento durante el desentrenamiento.

Revista de Preparación Física en el Fútbol. ISSN 2020, 1889, 5050.

5. Christensen, P.M.; Krustrup, P.; Gunnarsson, T.P.; Kiilerich, K.; Nybo, L.; Bangsbo, J. VO2 kinetics and performance in soccer players after intense training and inactivity. Medicine and Science in Sports and Exercise 2011, 43, 1716-1724.

6. Jukic, I.; Calleja-González, J.; Cos, F.; Cuzzolin, F.; Olmo, J.; Terrados, N.; Njaradi, N.; Sassi, R.; Requena, B.; Milanovic, L. Strategies and Solutions for Team Sports Athletes in Isolation due to COVID-19. Multidisciplinary Digital Publishing Institute: 2020.

7. Campos-Vazquez, M.A.; Mendez-Villanueva, A.; Gonzalez-Jurado, J.A.; León-Prados, J.A.; Santalla, A.; Suarez-Arrones, L. Relationships between rating-of-perceived-exertion-and heart-rate-derived internal training load in professional soccer players: a comparison of on-field integrated training sessions. International journal of sports physiology and performance 2015, 10, 587-592.

8. Costa, J.A.; Brito, J.; Nakamura, F.Y.; Figueiredo, P.; Rebelo, A. Using the Rating of Perceived Exertion and Heart Rate to Quantify Training Intensity in Female Soccer Players: Validity and Utility. Journal of strength and conditioning research 2019.

9. Foster, C.; Florhaug, J.A.; Franklin, J.; Gottschall, L.; Hrovatin, L.A.; Parker, S.; Doleshal, P.; Dodge, C. A new approach to monitoring exercise training. The Journal of Strength & Conditioning Research 2001, 15, 109-115.

10. Parveen, S.; Islam, M.S.; Begum, M.; Alam, M.-U.; Sazzad, H.M.; Sultana, R.; Rahman, M.; Gurley, E.S.; Hossain, M.J.; Luby, S.P. It's not only what you say, it's also how you say it: communicating nipah virus prevention messages during an outbreak in Bangladesh. BMC public health 2016, 16, 726.

11. Brooks, S.K.; Webster, R.K.; Smith, L.E.; Woodland, L.; Wessely, S.; Greenberg, N.; Rubin, G.J. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. The Lancet 2020.

12. Wong, C.-S.; Law, K.S. The effects of leader and follower emotional intelligence on performance and attitude: An exploratory study. The leadership quarterly 2002, 13, 243-274.

13. Kopp, A.; Jekauc, D. The influence of emotional intelligence on performance in competitive sports: A meta-analytical investigation. Sports 2018, 6, 175.

14. Ubago-Jiménez, J.L.; González-Valero, G.; Puertas-Molero, P.; García-Martínez, I. Development of Emotional Intelligence through Physical Activity and Sport Practice. A Systematic Review. Behavioral Sciences 2019, 9, 44.

15. Shi, J.; Wang, L. Validation of emotional intelligence scale in Chinese university students. Personality and Individual Differences 2007, 43, 377-387.

16. Castro-Sánchez, M.; Zurita-Ortega, F.; Chacón-Cuberos, R.; López-Gutiérrez, C.J.; Zafra-Santos, E. Emotional intelligence, motivational climate and levels of anxiety in athletes from different categories of sports: analysis through structural equations. International journal of environmental research and public health 2018, 15, 894.

17. CSD. Estadistica de Deporte Federado 2019. Técnica, S.G., Ed. Ministerio de Cultura y Deporte: Madrid, 2020.

18. Andrade, E.; Arce, C.; De Francisco, C.; Torrado, J.; Garrido, J. Versión breve en español del cuestionario POMS para deportistas adultos y población general. Revista de Psicología del deporte 2013, 22, 95-102.

19. Pacheco, N.E.; Rey, L.; Sanchez-Alvarez, N. Validation of the Spanish version of the Wong Law emotional intelligence scale (WLEIS-S). Psicothema 2019, 31, 94-100.

20. Browne, K. Snowball sampling: using social networks to research non-heterosexual women. Int J Soc Res Methodol 2005, 8, 47-60.

21. Deutskens, E.; De Ruyter, K.; Wetzels, M.; Oosterveld, P. Response rate and response quality of internet-based

surveys: An experimental study. Marketing letters 2004, 15, 21-36.

22. Mavletova, A.; Couper, M.P. Mobile web survey design: scrolling versus paging, SMS versus e-mail invitations. Journal of Survey Statistics and Methodology 2014, 2, 498-518.

23. Condello, G.; Capranica, L.; Doupona, M.; Varga, K.; Burk, V. Dual-career through the elite university student-athletes' lenses: The international FISU-EAS survey. PLoS ONE 2019, 14, e0223278.

24. WHO. Coronavirus disease 2019 (COVID-19) Situation Report –83; World Health Organization: 2020.

25. Cohen, J. Statistical power analysis for the behavioral sciences; Academic press: 2013.

26. Valentine, J.C.; Cooper, H. Effect size substantive interpretation guidelines: Issues in the interpretation of effect sizes. Washington, DC: What Works Clearinghouse 2003, 1-7.

27. Olusoga, P.; Butt, J.; Hays, K.; Maynard, I. Stress in elite sports coaching: Identifying stressors. Journal of Applied Sport Psychology 2009, 21, 442-459.

28. Xiang, M.; Zhang, Z.; Kuwahara, K. Impact of COVID-19 pandemic on children and adolescents' lifestyle behavior larger than expected. Progress in Cardiovascular Diseases 2020.

29. de La Vega Marcos, R.; Barquín, R.R.; García-Mas, A.; Balagué, G.; Zafra, A.O.; del Valle Díaz, S. Consistencia y fluctuación de los estados de ánimo en un equipo de fútbol profesional durante una competición de play off. Revista de Psicología del deporte 2008, 17, 241-251.

30. Slimani, M.; Paravlic, A.H.; Mbarek, F.; Bragazzi, N.L.; Tod, D. The relationship between physical activity and quality of life during the confinement induced by COVID-19 outbreak: a pilot study in Tunisia. Frontiers in psychology 2020.

31. De la Vega Marcos, R.; Barquín, R.R.; Hernández, P.B.; González, C.M.T. Una nueva medida tridimensional del estado de ánimo deportivo: el POMS-VIC. Cuadernos de Psicología del Deporte 2014, 14, 37-46.

32. Clemente-Suárez, V.J.; Fuentes-García, J.P.; de la Vega Marcos, R.; Patiño, M.J.M. Modulators of the Personal and Professional Threat Perception of Olympic Athletes in the Actual COVID-19 Crisis. 2020.

33. Saw, A.E.; Main, L.C.; Gastin, P.B. Monitoring the athlete training response: subjective self-reported measures trump commonly used objective measures: a systematic review. Br J Sports Med 2016, 50, 281-291.

34. Corsini, A.; Bisciotti, G.N.; Eirale, C.; Volpi, P. Football cannot restart soon during the COVID-19 emergency! A critical perspective from the Italian experience and a call for action. BMJ Publishing Group Ltd and British Association of Sport and Exercise Medicine: 2020.

35. Mann, R.H.; Clift, B.C.; Boykoff, J.; Bekker, S. Athletes as community; athletes in community: covid-19, sporting mega-events and athlete health protection. BMJ Publishing Group Ltd and British Association of Sport and Exercise Medicine: 2020.