Original Article

Prevalence of COVID-19 symptoms and RT-PCR tests among professional football players of Iranian two top leagues

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Abstract

Background: Following the resumption of football training and competitions during the coronavirus disease 2019 (COVID-19) pandemic, it was necessary to tighten up the hygiene protocol and impose restrictions such as prohibiting spectators from entering stadiums and the detection of positive disease cases, particularly among sub clinically infected players. The purpose of our study was to find out how common COVID-19 is among professional football players and to see if regular PCR testing and symptom recording are adequate screening methods in football.

Study design: A cross-sectional retrospective study was used as the study design.

Method: Periodic polymerase chain reaction (PCR) testing are used to evaluate athletes and other involved people for breaks in the transmission chain and to preserve their health. From March to November 2020, 784 players from Iran's prime and second division leagues participated in this study. The symptoms of the participants, as well as the results of the PCR testing, were recorded.

Results: The results showed that 107 cases (13.6%) had positive PCR tests, with 52 Premier League players (10.4%) and 55 second-tier League players among them (19.3 percent). 41.1 percent of individuals who had positive PCR testing were symptom-free, while 17.5 percent of those who tested negative experienced at least one symptom. Myalgia was the most commonly reported symptom among symptomatic participants (7%).

Conclusion: Due to the large number of asymptomatic patients, we advocate combining a periodic PCR test with serologic tests for the diagnosis of COVID-19 in football players to improve diagnostic accuracy.

Keywords: COVID-19, Polymerase chain reaction, Sports, Football

Introduction

COVID-19 is one of the world's most difficult problems today (1). Over a year ago, this disease was designated a pandemic (2) . Human communities had some changes throughout this time period. One of the facets of human existence that was impacted was sport, particularly football. The football world was affected by this ailment in terms of health, economics, and social issues (3-5). The SARS-CoV-2 virus transmits swiftly between physically close people (a space of less than 1.8 m between them for at least 15 minutes) via respiratory droplets or aerosols (6, 7). The physical distance between the players may be short, and it requires frequent travels and, as a result, the use of hotels and airports to play games, the risk of illness transmission and spread is great in football (8, 9).

Although the actual distance between the participants may be modest, frequent travel is required, necessitating the usage of hotels and airports to play games. In football, there is a high danger of illness transmission and dissemination (8, 9). Professional footballers appear to have a decreased risk of COVID-19's catastrophic consequences, despite the fact that they are young and have few comorbidities. However, it should be highlighted that if athletes become infected, their health and performance may be jeopardized (8-10).

The competent authorities decided to stop matches and postpone leagues in order to break the chain of transmission and protect the health of athletes and other individuals engaged (11-14). After a short period, by restarting training and returning to contests, it became necessary to increase hygiene regimen and apply limits such as prohibiting spectators from entering stadiums (15-17) and evaluating and spotting positive disease cases to safely resume athletic events (18, 19). Many persons who have COVID-19 don't show any symptoms and are simply carriers. Detecting people with subclinical illnesses aids in the control of the outbreak (20, 21). As a result, individuals are screened using a standard polymerase chain reaction (PCR) test, which is the gold standard of diagnosis (19).

A few investigations on the prevalence of this condition among elite athletes have been conducted. However, additional research is needed in professional sports to develop preventative and diagnosis measures. The study's goal was to see if periodic PCR testing and symptom recording are adequate screening techniques in football, particularly for diagnosing asymptomatic patients.

Methods

From March to November 2020, a cross-sectional retrospective study was conducted on the Iranian football team. The study covered all male football players who played for Premier and Second Division League teams and took the preseason exams. A total of 784 players from sixteen Premier League teams and twelve second-tier league teams were surveyed (499 players from the Premier League and 285 players from the second division league). Players who had not played for any team during that time period were excluded, as were those who had a history of cardiorespiratory, cutaneous, metabolic, gastrointestinal, neurological, or other infectious disorders.

On August 22, 2019, the season began. Following the coronavirus epidemic, it was postponed for four months on February 28, 2020, after the 21st week of competitions. The teams resumed training on May 23, 2020, and contests began on June 24, 2020, with health strategies in place, with the season ending on August 20, 2020.

If players had any symptoms, they had to report them to their team's doctor on a daily basis. In October 2020, during preseason exams, a checklist was prepared to re-check the symptoms, and players were asked to say "Yes" if they had experienced any of the following symptoms in the previous eight months: fever, chills, new cough or worsening of a previous cough, runny nose, sore throat, shortness of breath or chest pain, myalgia, malaise, nausea, vomiting, or diarrhea, new skin rashes, loss of taste or smell, and appetite loss.

If players developed any worrisome symptoms during the four months of the league's closure, their team physician recommended them for PCR testing. All players were given a PCR test before the teams began training, and if the result was negative, the player was allowed to participate in the training. Even so, if the test came up positive, the player was placed on a two-week quarantine. He was allowed to engage in training if he had two negative tests within a 24-hour period. Following that, PCR testing were performed every two weeks. The FIFA Medical and Rehabilitation Center in Iran received all reports of symptoms and PCR testing on a weekly basis, and we used this information to perform our research.

A pharyngeal swab test was performed by experienced persons using kits approved by Iran's Ministry of Health, and the results were reported as positive, negative, or inconclusive using cycle threshold (CT) values (CT > 40 as negative and CT > 40 as positive). The ethics committee of the Iran University of Medical Sciences, Tehran, Iran, provided the ethical approval code IR.IUMS.FMD.REC.1400.162.

SPSS software version 26 was used for all statistical analysis. The variables' descriptive analysis was

presented in the form of frequency and percentages, with age-related data presented as means. The distribution of the players' ages, teams, and positions was studied. Logistic regression was used to examine the impact of player age and position on positive tests. The Adjusted Odds Ratio (OR) was estimated with a 95 percent confidence interval (CI) and a 5 percent significance threshold.

Results:

The study comprised a total of 784 male professional football players. They were all under the age of 40, with a median age of 26.3 26.4 years. Table 1 shows the demographic features of the players. A positive PCR test was found in 107 cases (13.6%), including 52 Premier League players (10.4%) and 55 second-tier League players (19.3 percent).

Furthermore, no case had a positive test more than once, and there was no hospitalization or fatality. 44 (41.1%) of individuals who had positive PCR testing were symptom-free, while 89 (17.5%) of those who tested negative experienced at least one symptom (Table 2). Myalgia was the most commonly reported complaint among symptomatic patients (7 percent).

With the PCR test, there was no statistically significant link between player position and age (Table 3). The findings of the logistic regression showed that there is a statistically significant link between players' position and runny nose and sore throat (P-value =.031, P-value =.023) at the 95 percent confidence level. The results demonstrated a statistically significant link between experiencing at least one symptom over the previous 8 months and the PCR test (OR = 6.77, 95 percent CI = 4.32 to 10.59, P-value.001).There was a statistically significant relationship with the PCR test and symptoms of fever, chills, cough, runny nose, body aches, fatigue, headache, vomiting and nausea, diarrhea, loss of smell and appetite (Table 4).

Discussion:

The goal of this study was to determine the rate of SARS-CoV-2 infections among professional football players in two of Iran's major divisions, as well as to better understand elite athletes' reactions to the COVID-19 epidemic. During the 8 months of our investigation, we found a significant prevalence of positive COVID-19 PCR tests among players, with nearly half of them being asymptomatic. Having at least one symptom for at least 8 months had a statistically significant connection with a positive PCR test in the current investigation. Myalgia was the most commonly reported complaint among the subjects.

Infection transmission from asymptomatic individuals is similar to that from symptomatic patients, according to previous research (22). An asymptomatic patient's infection has been reported to spread to multiple other people in various cases (23, 24). The high frequency of asymptomatic patients among football players emphasizes the significance of finding these people to stop the disease from spreading (24).

The use of PCR testing in players on a regular basis increases the chances of detecting those who are infected. Boger and colleagues (25), in a meta-analysis, found that the PCR test is the gold standard for detecting COVID-19, and that using other diagnostic procedures (such as serology) at the same time improves diagnostic accuracy. As a result, it is sensible to use periodic PCR tests and simultaneous serological assays to identify patients. Moreno and colleagues (26), on the other hand, found that a serological test alone could not detect COVID-19 and hence prevent its spread.

The number of SARS-CoV-2-positive tests was used by Pederson and colleagues 26 to examine the consequences of football clubs reopening in Denmark's two finest male football leagues. In the 11 weeks that they were symptom-free, the incidence rate was 0.53 percent (27). During the 9-week study period, the rate of positive tests among players in another study on Qatar leagues was 4.4 percent (28). All of the participants in Mack and colleagues' study (29), however, had negative PCR tests, while just 2% of these best players showed positive IgG.

Wang and colleagues (30) observed that 34.8 percent of patients in their population-based study had myalgia, which is similar to our findings. During the same 13-week period, Dixon and colleagues (31) discovered that 11.6 percent of SARS-CoV-2 positive tests were among 1190 collegiate football participants in the Southeastern Conference. Furthermore, van den Zee-Neuen and colleagues (32) observed 146 professional Austrian football players for 12 weeks, during which time they were subjected to weekly PCR testing, and found that no one tested positive. Only 3.42 percent of these players reported a sore throat, and 2.05 percent reported body aches, among the symptoms of cough, breathing difficulty, loss of sense of smell or taste, body aches, and anxiousness. The symptoms raised the likelihood of COVID-19 detection in Hassanmirzaei and colleagues' investigation (33). In this regard, just 2.3 percent of football players had positive PCR in their study, although 17.9% of football players had positive PCR in a serological survey.

Our study, unlike other studies, took a much longer time to examine the prevalence of Covid among footballers. However, one of its limitations is the lack of serological tests during this period. Also players may not have answered their symptoms correctly in the checklist.

Table 1. Demographic characteristics of football players

Characteristics	frequency	Percentage %
Sex Male	784	100
Age <20 20-25 26-30 >30 Not reported	57 271 215 125 116	7.3 34.6 27.4 15.9 14.8
position in field Goalkeeper Defender Midfielder Striker Not reported	75 220 244 128 117	9.6 28.1 31.1 14.9
League Premier first division	499 285	63.6 36.4

Table 2. Distribution of PCR tests

		frequency	Percentage %
PCR test	Positive	107	13.6
	Negative	677	86.4
	Total	784	100
Positive PCR	Symptomatic	63	58.9
	Non-symptomatic	44	44.1
	Total	107	100
Negative PCR	Symptomatic	89	17.5
		588	82.5
		677	100

Table 3. Distribution of position in the field and positive PCR test

	P value and OR							
	Position				Age			
	Goalkeeper	Defender	Midfielder	Striker	<20y	20-25y	26-30	>30y
Positive PCR	0.079 0.65 (0.12, 3.50)	0.075 1.78 (0.62, 5.10)	0.170 2.05 (0.72, 5.80)	- 1.00	0.688 1.20 (0.49, 2.92)	0.568 1.20 (0.64, 2.24)	0.507 1.24 (0.65, 2.37)	- 1.00

Table 4. Distribution of symptoms and PCR test results

Symptoms in 8 months		PCR		OR (95% CI)	P-value
		Positive Number%	Negative Number%		
Fever	Yes	14(14.6)	17(3.3)	4.95 (2.35, 10.42)	<0.001
	No	82(85.4)	493(96.7)		
Chills	Yes	10(10.4)	15(2.9)	3.83 (1.66, 8.82)	0.002
	No	86(89.6)	495(97.1)		
Cough	Yes	20(21.3)	22(4.3)	5.99 (3.12, 11.51)	<0.001
	No	74(78.7)	488(95.7)		
Runny nose	Yes	21(22.3)	24(4.7)	5.82 (3.08, 10.99)	<0.001
	No	73(77.7)	486(95.3)		
Sore throat	Yes	7(7.5)	18(3.5)	2.22 (.90, 5.48)	0.082
	No	86(92.5)	492(96.5)		
Myalgia	Yes	25(26.6)	27(5.3)	6.48 (3.55, 11.80)	<0.001
	No	69(73.4)	483(94.7)		
Fatigue	Yes	22(23.4)	18(3.5)	8.35 (4.27, 16.32)	<0.001
	No	72(76.6)	492(96.5)		
Headache	Yes	18(19.1)	20(3.9)	5.80 (2.93, 11.46)	<0.001
	No	76(80.9)	490(96.1)		
Vomiting	Yes	9(9.6)	7(1.4)	7.60 (2.76, 20.97)	<0.001
	No	85(90.4)	503(98.6)		
Diarrhea	Yes	5(5.3)	4(0.8)	7.10 (1.87, 26.97)	0.004
	No	89(94.7)	506(99.2)		
Loss of smell	Yes	7(7.4)	11(2.2)	3.65 (1.37, 9.67)	0.009
	No	87(92.6)	499(97.8)		
Loss of appetite	Yes	12(12.8)	8(1.6)	9.18 (3.64, 23.11)	<0.001
	No	82(87.2)	502(98.4)		
Shortness of breath	Yes	2(2.1)	4(0.8)	2.75 (.49, 15.23)	0.247
	No	92(97.9)	506(99.2)		
Having at least one symptom in 8 months ago	Yes	44(41.1)	421(82.5)	6.77 (4.32, 10.59)	<0.001
	No	63(85.9)	89(17.5)		

Conclusion

Due to the high level of asymptomatic patients, the golden standard test for diagnosis (PCR) and increasing diagnostic accuracy in the case of simultaneous use of other methods such as serology, we recommend using a periodic PCR test with serologic tests for diagnosis COVID-19 in football players.

Acknowledgement

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