Research Paper

Epidemiological Evaluation of Physical and Mental Health Complications in Athletes Aged 18-35 Years Following the Quarantine Period Due to the COVID-19 Pandemic

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ABSTRACT

Purpose: In December 2019, the COVID-19 pandemic urged governments to take unprecedented precautions to restrain the rapid spread of the disease. Those precautions included home quarantine, banning all public gatherings, closures of all recreational and sports facilities, and many other measures, which significantly impacted the global community. The present study aims to evaluate physical and mental health problems ensuing the quarantine period caused by the COVID-19 pandemic in athletes.

Methods: A retrospective cohort study was conducted on 501 male and female athletes aged 18 to 35 years. To collect data, we used three standardized online questionnaires: sports injury, SF-36 quality of life (QoL), and Goldberg's general health questionnaire.

Results: In this cross-sectional study, 501 participants were recruited (375 female and 126 male athletes). Most injuries were related to the ankle (23%) and the knee (12.82%). The Mean±SD score of the QoL questionnaire was 30.43±3.79. The Mean±SD score of the general health questionnaire was 36.81±4.19.

Conclusion: The prevalence of physical injuries, especially in the knee and ankle joints, was high. Physical inactivity, lack of exercise, and psychological conditions governing society could cause changes in athletes' physical performance and might be accompanied by musculoskeletal disorders during the COVID-19 pandemic.

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Highlights

- The physical and mental health levels decreased or remained invariable during the COVID-19 period.
- The highest rate of injuries occurred in the knee and ankle joints.
- We recommend to use a suitable training program in open spaces in the pandemic situations.

Plain Language Summary

In summary, the physical and mental health levels decreased or remained invariable during the COVID-19 period, and the highest rate of injuries occurred in the knee and ankle joints. we recommend to use a suitable training program in open spaces and under the supervision of a trainer or use training programs under the supervision of an online trainer in a safe and suitable place, in the pandemic situations. It is also recommending to pay attention to the standard facilities and equipment required during training and avoid sudden discontinuation of sport activities.

1. Introduction

Athletes need effort, training, and perseverance to achieve their goals; it does not matter that they are sprinters, endurance swimmers, riders, or any other athletes [1]. Another important factor for success is mental health [1]. In the training program, various adaptations occur in the physical fitness factors, which are of particular importance for athletes in reaching their goals. Maintaining the adaptations in the pre-season before the competitions, during the competition, in the off-season, and after the competitions is crucial for coaches and athletes of various sports because these adaptations have been achieved over a long period. If the athletes lost these adaptations due to the sudden discontinuation of training, it is necessary to endure hard training for a long time to regain adaptations, which requires a lot of time and energy [2].

Athletes put a lot of effort to improve their level in sports activities. However, interruptions in training may occur voluntarily or involuntarily. At the beginning of 2020, the World Health Organization announced COVID-19 as a pandemic. Afterward, millions of cases of COVID-19 and its related deaths were reported by the centers for disease control and prevention in different countries [3]. To prevent the spread of COVID-19, state and local governments enacted numerous restrictions on human movements and physical interactions [3]. As a result, various public centers, sports venues, stadiums, and hotels were closed and important events around the world such as various sports competitions, even the 2020 Olympics were postponed [4]. Therefore, restrictions on routine activities of daily living or training in gyms occurred due to home quarantine, which led to metabolic changes in people [5]. It also had physiological effects such as stress, anxiety, fear, irritability, and confusion. COVID-19 and home quarantine jeopardizes people's physical and mental health with increased inactivity and changes in lifestyle, work, and activities of daily living [5].

Considering the extreme similarity between immobility and home quarantine, its novelty, and the lack of information about it, previous studies related to immobility can be used to investigate the complications caused by COVID-19. A previous study showed that physical inactivity negatively affects body metabolism, bone mineral turnover, cardiovascular health, muscular endurance, and muscle strength [5]. Moreover, a significant decrease was observed in maximum oxygen consumption and oxidative enzymes 2-4 weeks after detraining [6]. Detraining results in a reduction in mitochondrial enzyme activity and an increase in overall lactate dehydrogenase activity in exercised skeletal muscle [7]. Among the other consequences of detraining, important changes in the musculotendinous unit such as reduction in stiffness and strength of tendon, and weakness and atrophy in muscle could be mentioned [8, 9]. Also, detraining for 1 month can decrease the cross-sectional area of muscle [10].

It seems that forced and sudden abandoning of sports activities will be associated with complications for all people, especially athletes. Because the home quarantine is a stressful phenomenon, and there is no sufficient information about sports injuries during the COVID-19 pandemic era and their possible effects on the psychological dimensions of athletes, conducting an epidemiological study seems necessary. Hence, the present research aims to investigate the epidemiology of sports injuries

and the mental health status of athletes aged 18-35 years during the quarantine due to the COVID-19 pandemic.

2. Materials and Methods

This study is a descriptive, retrospective study by nature. The samples were selected by convenience sampling method. The study included 500 athletes aged 18 to 35 years (average age of 28 years) with a history of at least 3 months of regular sports activities. However, they had to abandon or minimize their exercise training due to the COVID-19 pandemic. All stages of the research were approved by the Ethics Committee of Allameh Tabataba'i University with the ethical code of IR.ATU.REC.1400.044.

Three online questionnaires on sports injuries, quality of life (QoL), and general mental health were used and the PorsLine platform was employed. All questionnaires were in Persian, the mother tongue of all participants.

The inclusion criteria were all amateur and professional athletes in the age range of 18 to 35 years who played in different sports gyms. The exclusion criteria were all individuals with a history of injury in the past year that caused the athlete to stay away from exercise or not to train continuously, a history of certain diseases such as diabetes, multiple sclerosis, kidney disease, cancer, heart diseases, a history of drugs consumption such as cholesterol-lowering drugs, and membership in the professional teams such as national teams.

During the study period, since in-person interviews were not possible, online consent was obtained from the participants, and their anonymous data were used for the study purposes. The questionnaires were sent to the athletes. The athletes were asked to answer questions regarding their conditions and changes in the past year.

We used the Persian version of the Oslo Sports trauma research center questionnaire on health problems as a reliable and valid tool for recording sports injuries in athletes, retrospectively (internal consistency of 0.89. Kappa agreement coefficient of 0.71 to 0.81) [11].

Moreover, to examine the QoL, we used the Persian version of the SF-36 standard questionnaire with a high level of validity and reliability (0.9-0.77) [12]. The general health questionnaire was utilized to assess the mental health of participants. The reliability and validity of this tool have been confirmed in previous studies [13, 14].

The questions were administered through applications such as WhatsApp, Telegram, or Email. The classification and number of questions were the same for all people. The questionnaire on sports injuries included two parts, the first part included 33 questions, comprising basic information, as well as information about sports and training competitions, and the second part included questions about acute and chronic injuries endured by the participant. The participants with no history of injury did not answer this section.

In general, we gathered information about the rate of sports injuries, their mechanisms, the components of physical symptoms, anxiety symptoms, insomnia, social functioning impairment, depression symptoms, health status, and QOL. The QOL questionnaire consists of two parts. The first part has 33 questions, which include basic information, as well as information about sports competitions and training. The general health questionnaire includes two questions on health status and QOL in general and 24 questions on four areas of physical health, mental health, social relations, and general health.

Data analysis was done using SPSS software, version 26. Descriptive statistics, including the Mean±SD, were used to describe the data of the study variables.

3. Results

Out of 500 participants, 375 were female athletes and 126 were male athletes with Mean±SD age of 28±3.76 years. Also, 22.4% of participants pursued athletics, 19% were involved in martial arts, 11% in bodybuilding and fitness, 9.2% in volleyball, 7.4% in aerobics, and 24% in other fields.

During the COVID-19 pandemic, 28.1% of athletes abandoned sports activities; 24.5% reduced their intensity a little; 13.7% reduced their intensity very much, and 33.7% did not change the intensity of their sports activities. In addition, changes in people's weight during this period were at least 1 and at most 20 kg. About 46% of athletes (230 people) gained weight, 20.8% (104 people) lost weight, and 33.2% (166 people) had no weight change.

Most injuries occurred at the knee and ankle joints. The injuries were classified as acute and chronic (Table 1).

The Mean±SD score of the QOL questionnaire was 30.43±3.79. The highest score on the QOL test was 35; the lowest score was 15. More details are presented in Table 2.

Table 1. Location and rate of acute and chronic injuries

Anatomical Location	No. (%)		
	Chronic Injuries (n=78)	Acute Injuries (n=163)	Total (n=241)
Head and neck	1(1.28)	0(0)	1(<1)
Shoulder	11(14.10)	3(1.84)	8(3.32)
Elbow	4(5.13)	1(<1)	5(2.07)
Wrist and fingers	8(10.26)	4(2.41)	12(4.98)
Chest	3(3.85)	0(0)	3(1.24)
Thigh and pelvis	2(2.56)	1(<1)	3(1.24)
Knee	10(12.82)	99(60.73)	109(45.23)
Ankle	23(29.48)	51(31.29)	74(30.71)
Feet and toes	16(20.51)	8(4.91)	24(9.96)

PHYSICAL TREATMENTS

The Mean±SD of the general health questionnaire was 36.81±4.19 (Table 3).

4. Discussion

The purpose of the current research was to investigate the rate of sports injuries and mental health during the quarantine period caused by the COVID-19 pandemic. Among the athletes of different ages and skill levels, about half of them reported physical complications and a reduction in mental health. The Mean±SD score of the general health questionnaire was 36.81±4.19. Also, the Mean±SD score of the QOL questionnaire was 30.43±3.79.

The results showed that the highest rate of injury occurs in the knee and ankle joints. Rotational movements, jumping, landing, contact with another person, with the ground, or with training equipment, and games without the presence of a referee, coach, or medical team have been reported as the causes of a high prevalence of knee injuries [15, 16]. The reasons for the high injury rate in

Table 2. The total and components score of quality of life questionnaire

Variables	Lowest Score	Highest Score	Mean±SD
Total	15	35	30.43±3.79
Physical health	12	27	22.6±3.18
Psychological health	4	12	10.97±1.70
General health	3	9	8.25±1.4

PHYSICAL TREATMENTS

Table 3. The total and components score of the mental health questionnaire

Categorization of Scales	Lowest Score	Highest Score	Mean±SD
Impairment of social functioning	3	12	7.53±2.022
Depression	6	20	15.60±2.732
Anxiety	4	16	13.650±2.91
Total	22	48	36.81±4.19

PHYSICAL TREATMENTS

the ankle might be a deficiency of sports rules, the lack of strict supervision by the coach, and inappropriate location and shoes for training [17, 18].

Of those who suffered from chronic injuries, only 9% stated that they were unable to participate in the training due to injuries; however, in a study that Peffirman conducted before the pandemic on other athletes in sports like soccer, 40% absence of athletes with chronic injuries has been reported [19].

By comparing the results of the present study with pre-pandemic studies, the rate of athletes' injuries increased or remained unchanged during the COVID-19 pandemic.

The results regarding the negative impact of COVID-19 quarantine on the QOL and mental health are consistent with previous studies conducted on different populations.

It has been reported that quarantine had a negative effect on the QOL of multiple sclerosis patients. Disruption in the physical rehabilitation of multiple sclerosis patients is reported to be a possible explanation for the reduction in QOL [20]. In another study, it was shown that home quarantine negatively impacted the QOL in the general population in both genders, especially in women. A higher level of anxiety has been reported as an important factor in decreasing the level of QOL in this general population [21].

About two-thirds of children and adolescents in Germany reported that they have been burdened by the COVID-19 pandemic, and 40% of them reported a low level of health-related QOL. They also reported more health problems and higher anxiety levels compared to the pre-pandemic era [22].

The consequences of the COVID-19 pandemic and quarantine include lack of training and organized competition, lack of communication between athletes and coaches, inability to move freely and stay in confined space, inappropriate training conditions, and unorganized training schedules and competitions.

Based on the currently available scientific information, it is recommended to train and encourage athletes to employ appropriate preventive and proper behaviors to improve physical and mental health. Also, the athletes' living space should be equipped with cardio and resistance training equipment such as a stationary bike.

5. Conclusion

In summary, the physical and mental health levels of the athletes decreased or remained invariable during the COVID-19 period, and the highest rate of injuries occurred in the knee and ankle joints. we recommend using a suitable training program in open spaces and under the supervision of a trainer or using training programs under the supervision of an online trainer in a safe and suitable place, in the pandemic situations. It is also recommended to pay attention to the standard facilities and equipment required during training and avoid sudden discontinuation of sports activities.

Research limitations

The data obtained in this study might have some errors because the study was conducted during the pandemic, in which people were suffering from anxiety and depression, in quarantine conditions, and were not in normal conditions.

Ethical Considerations

Compliance with ethical guidelines

The Research Ethics Committee of Allameh Tabataba'i University approved the current research (Code: IR.ATU.REC.1400.044).

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This paper was extracted from Faezeh Safari's thesis in Department of sports injuries and corrective exercises, Allameh Tabataba'i University.

Authors' contributions

All authors equally contributed to preparing this article

Conflict of interest

The authors declared no conflict of interest.

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