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The psychological state of elite athletes during the COVID-19 pandemic

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Abstract

Background: The study of the psychological effects of this viral disease on the mental health of individuals at different levels of society, especially elite athletes, is of great importance.

Aim: Present study aimed to investigate the psychological status of elite athletes during the COVID-19 pandemic.

Materials and Methods: The statistical population of this study included 87 Iranian elite and national athletes in various sports. The statistical population of this study included 87 elite and national athletes in various sports. Data were collected using the stress, anxiety, depression inventory (DASS-14), perceived stress inventory (PSS-14), the revised event impact inventory (IES-R), and the Graz Emotional Disorders Questionnaire.

Results: There is no significant difference between the components of depression, anxiety, event impact, and emotional disorders ($P \geq 0.05$). There is a significant difference between the mean scores obtained by elite athletes and the mean scores of the stress component ($P=0.01$). The mean scores obtained by elite athletes were lower than the mean scores in the perceived stress component ($P=0.001$).

Conclusion: The elite Iranian athletes in the Corona pandemic are in a relatively good psychological state.

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1. Introduction

In December 2019, the spread of a disease called Corona virus, or COVID-219, was reported in the city of Wuhan, China [1]. COVID-19 is an acute respiratory syndrome and a genetic change in the Sars family [2]. Fever, fatigue, cough, and muscle aches are the primary symptoms of this disease [3]. Due to the high speed of spreading and transmission of this virus, methods such as isolation, home quarantine, and social distancing are being implemented all over the world as a solution to fight and prevent contracting the disease of COVID-19 [4].

Interventions such as quarantine and social distancing have caused changes in people's lifestyle, diet, physical activity, and social relationships. Studies show that social distancing and quarantine increase psychological symptoms such as anxiety, depression, stress, anger, emotional disorders, and irritability [5].

One important component in the incidence of psychological discomfort is staying at home to lower the risk of illness transmission. Numerous businesses and schools had to close as a result of this decision. Rescheduled organized sports events led to a reduction in social interaction. Due to changes in living conditions, less social and physical interaction, and being apart from loved ones, the period of isolation can have psychological impacts including depression and anxiety.

Jiménez-Pavón et al. (2020) stated that in addition to physical effects and changes, quarantine leads to psychological consequences such as depression, stress, anxiety, anger, and symptoms of post-traumatic stress disorder [6]. A number of sports activities are also negatively impacted by the COVID-19 pandemic. As a result, several national and international sporting events and contests have been postponed or cancelled, including the 2020 Olympics, and structured training and team practices have decreased.

As a result, many athletes found it difficult to carry out their regular training or other commitments [7]. A lot of sportsmen have to practice in isolation or in confinement at home. Their regular activities, which include using tools, attending professional groups, and engaging in outdoor activities, serve to offset the constraints and confinement they currently face at home [8].

Reports state that many athletes have overcome obstacles to carry on with their everyday practice and training by finding alternate techniques and making the necessary adjustments during the pandemic. However, experts in mental health have indicated that physical activity may be a means of enhancing psychological health within the pandemic [7]. Home-based physical exercise programs, for instance, have the potential to help to the reduction of symptoms associated with symptoms of sadness and anxiety [9]. This may be a good perspective, but regular exercise may not have the same effects as the kinds needed by athletes, especially those getting ready for competition. Regarding the pandemic's detrimental effects on sportsmen, there are still a number of possible problems that need to be taken into account [6].

In the Corona pandemic, people have experienced various behavioral problems according to their job characteristics, level of health and physical fitness, and different lifestyles. In this regard, Naeimi Kia and Gholami (2019) found that physical activity can reduce the perceived psychological stress in a group that is physically active [10]. However, a prior study on French

athletes revealed increased anxiety scores upon returning to the competition following the COVID-19 lockdown. Additionally, elite athletes view competition as a new source of stress [11].

One of the most important disorders that can threaten the mental health of people in quarantine is stress, anxiety, and depression. In a study by Shahbazi et al. (2023), they found a movement between the mental health of active and inactive men and women in the conditions of the Corona pandemic. The results of this study showed that there is a significant difference between active and inactive women and men in the components of stress, anxiety, depression, and general mental health. In such a way that people who are active in terms of physical activity had lower scores in stress, anxiety, and depression indices [12].

In this regard, Shadmehr et al. (2020) compared the effects of moderate and high-intensity exercise on the stress, anxiety, and depression of people under home quarantine conditions during the Corona era. They found that moderate and high-intensity exercise reduces stress, anxiety, and depression, as well as increasing the resilience of people during home quarantine. They also stated that high-intensity exercises were more effective in reducing depression than moderate-intensity exercises [13].

Sport at the championship level has a special position and importance in any society and plays an important role in raising the national spirit, promoting sports and the honors of the country, helping the economy, and increasing political and national pride. Many elite athletes consider participation in major sporting events, including the Olympics, to be the pinnacle of their professional sports [14]. In this regard, they are trying to get the maximum amount of preparation for successful participation in this event. Preparing to participate in such an event requires years of effort and training, and elite athletes must plan carefully to reach their peak performance. In addition to physical, technical, and tactical preparation, athletes must be at the peak of mental preparation to participate in these competitions. Therefore, they should strengthen their psychological aspects. High physical and mental pressures in championship sports reduce the mental health of the athlete and affect their performance [15].

The epidemic and spread of the COVID-19 disease have affected all economic, social, political, and military aspects of the world. The discussion of the psychological effects of the disease on the health and mental health of people at different levels of society is very important. The adoption of methods such as home quarantine to prevent the widespread spread of this virus has affected different classes of people. Uncertainty about the condition of the disease, stress, anxiety, and depression are among the complications caused by quarantine [12].

Meanwhile, athletes have not benefited from these conditions and their effects. In this regard, there is a need to investigate the impact of the COVID-19 pandemic on athletes. It is necessary to identify the psychological disorders that occur as a result of the spread of this disease in order to prevent endangering the mental health of athletes. Therefore, the aim of this study is to investigate the effect of the COVID-19 pandemic on the psychological status of elite athletes.

2. Materials and Methods

2.1. Research design

The current study was a descriptive-analytical study of the cohort type,

descriptive in terms of implementation method, and practical in terms of purpose.

2.2. Statistical population and statistical sample

The statistical population included elite athletes and national champions in Iran. One hundred athletes and national champions were selected as available samples. The sample size was determined based on G Power 3.1.5 software with an effect size of 0.5, a significance level of 0.05, and a power of 0.8. The Perceived Stress Questionnaire (PSS-14), the Revised Weiss and Marmer Event Questionnaire (IES-R), and the Gratz Emotional Disorders Questionnaire were distributed online among the target population using Porsline software.

Out of the total distributed questionnaires, 87 correct and complete questionnaires were analyzed. The criteria for entering the research included all athletes with a Tokyo Olympic quota and members of national teams (In individual and group sports); 47 men and 40 women voluntarily participated in the research. Uncompleted or incomplete questionnaires were excluded from the study.

In order to carry out the research, the aforementioned questionnaires and instructions were given to the participants electronically. The participants were assured that their information will remain confidential and will not be disclosed in any of the stages of collecting, analyzing and publishing the results.

2.3. Depression, Anxiety and Stress Scale (DASS-21)

Lavibond and Lavibond18 developed the stress-anxiety-depression questionnaire in 1995 to measure stress-anxiety-depression, and it consists of 21 questions. The questionnaire consists of three components: stress, anxiety, and depression, each of which includes seven questions. The final score for each is obtained by adding the scores of the questions related to it. It is scored in such a way that each question is considered from 0 (does not apply to me at all) to 3 (extremely applies to me). Since the questionnaire used in this research is a shortened form of the main scale (42 questions), the final score of each subscale should be doubled. The reliability of this questionnaire was obtained using Cronbach's alpha method for the depression component (0.89), the anxiety component (0.84), the stress component (0.82), and the whole questionnaire (0.83). Also, Lovibond and Lovibond (1996) have declared the validity of the DASS-21 questionnaire as 0.77 [16]. Also, the reliability of this questionnaire in Iran was investigated and analyzed by Samani and Jokar (2007), in which Cronbach's alpha coefficients for stress, depression, and anxiety were reported as 0.87, 0.85, and 0.75, respectively [17].

2.4. Perceived Stress Scale (PSS-14)

The perceived stress questionnaire was prepared in 1983 by Cohen et al. in three versions of 4, 10, and 14 items [18]. This questionnaire was used to measure the perceived general stress in the last month. It measures thoughts and feelings about stressful events, control, overcoming, and coping with psychological pressure and stress experienced. This questionnaire has a 5-value scoring method, including never (0), almost never (1), sometimes (2), often (3), and often (4). The lowest score is 0, and the highest score is 56. A higher score indicates more perceived stress. Utilizing the Cronbach's alpha method in three studies, it was possible to determine the reliability of this questionnaire. 0.84-0.85. 7. In the research of Behrouzi and Shahni Yeelaghi (2007), the reliability of this

questionnaire was calculated using Cronbach's alpha coefficients and half-measures, respectively. 0.73 and 0.74 were obtained [19].

2.5. Impact of Event Scale- Revise (IES-R)

This questionnaire was prepared by Wiss (2008) and has 22 questions. Its purpose is to evaluate the dimensions of mental helplessness when facing certain events in life (avoidance, unwanted thoughts, and hyperarousal). This questionnaire has a 5-value scoring method, including never (0), rarely (1), sometimes (2), often (3), and strongly (4). The lowest score is 0, and the highest score is 88. The above questionnaire has three dimensions: avoidance, unwanted thoughts, and overstimulation. Higher scores on the entire questionnaire indicate a higher degree of helplessness. He shows that the IES (original form) subscales of unwanted thoughts and avoidance have up to 0.85 support for content and have good predictive validity for the subscale of hyperarousal related to trauma. Also, the reliability of the questionnaire was calculated using Cronbach's alpha method. The value of Cronbach's alpha was 0.87 for the avoidance component, 0.84 for the unwanted thoughts component, and 0.79 for the hyperarousal component [20]. Panaghi and Hakim Shoushtari (2005) reported the validity of this questionnaire to be 0.87 in Persian version of the revised impact event scale [21].

2.6. Gratz Emotional Disorders Questionnaire

Emotional dysregulation is a self-report index that was created to evaluate disorders in emotional regulation in a more comprehensive way than the existing tools in this field and has 36 questions and 6 subscales: non-acceptance of emotional responses, impairment in performing purposeful behaviors, impairment in impulse control, lack of emotional awareness, limited access to emotional regulation strategies, and lack of emotional clarity. This questionnaire has a 5-value scoring method, including never (1), sometimes (2), half of the time (3), most of the time (4), and always (5). The lowest score is 36, and the highest score is 180. Shabani Khadive and Ahmadian (2019) use Cronbach's alpha method to determine the reliability of the emotional dysregulation questionnaire, which was equal to 0.77 [22].

2.8. Statistical analysis

IBM SPSS Statistics version 27.0 was used for statistical analysis. To analyze the obtained data, in addition to descriptive statistical methods including mean and standard deviation, considering that the results of the Shapiro-Wilk test showed that the data in the components of depression, anxiety, stress, impact of the event, physical symptoms and emotional disorders do not have a normal distribution ($P \geq 0.05$), the non-parametric runes test was used for inferential analysis. Considering the normal distribution in the perceived stress component, one sample t-test was used to analyze the results.

3. Results

The data obtained from this research were analyzed using descriptive and inferential statistical methods. Descriptive information about elite athletes is shown in Figure 1.

The Shapiro-Wilk test was used to check the normality of the data distribution. The results showed that the data in the factors of depression, anxiety, stress, impact of the event, and emotional disorders do not have a normal distribution ($P \geq 0.05$), so the non-parametric the runes test was used to compare the averages of the data in the desired variables.

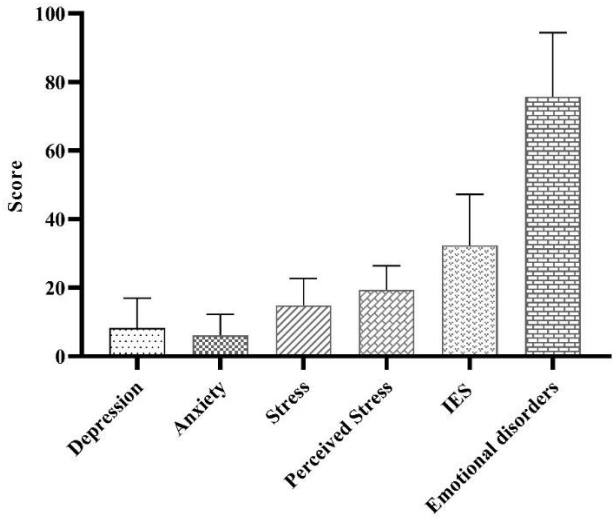

Figure 1. Summary of the results of descriptive statistics (mean and standard deviation) in the measured variables

The results of the runes test showed that there is no statistically significant difference between the average data in the depression variable (8.62±8.35) and the average scores of the questionnaire [14] (R= 87, *P*= 0.07). Also, there is no significant statistical difference between the mean of the data (6.54±5.73) and the mean of the questionnaire (10) in the variable of anxiety (R= 87, *P*= 0.24).

In fact, the results showed that athletes were in a good state in terms of depression and anxiety during the Corona virus. A truncated test was used to compare the mean of the data compared to the mean scores of the stress component. The results showed that the average scores obtained by the athletes in the stress component (14.91±7.78) were higher than the average scores of the questionnaire [14]. As a result, there is a statistically significant difference between the average scores obtained by national athletes and the average scores in the stress component (R= 87, *P*= 0.01).

In the event impact variable, the results of the runes test showed that there is no significant statistical difference between the average data in this variable (32.48±14.80) and the average scores of the questionnaire (R= 87, *P*= 0.85). Also, there is no significant statistical difference between the mean data in the emotional disorders component (57.70±18.71) and the mean scores of the questionnaire (108) (R= 87, *P*= 0.63). In the subscales of emotional disorders, including non-acceptance of emotional responses (R= 87, *P*= 0.61), disorder in performing purposeful behaviors (R= 87, *P*= 0.33), control disorder impulse (R= 87, *P*= 0.5), lack of emotional awareness (R= 87, *P*= 0.26), limitation in achieving emotion regulation strategies (R= 87, *P*= 0.35), and lack of emotional clarity (R= 87, *P*= 0.51), there is no significant statistical difference. The results of the runes test in the components of depression, anxiety, stress, the impact of the event, and emotional disorders and subscales of emotional disorders are shown in Table 1.

A sample t-tech test was examined to compare the average scores obtained by the athletes in the perceived stress component with the average scores of the questionnaire. According to the Shapiro-Wilk test, the distribution of scores was

normal (*P*= 0.64). The average score obtained by elite athletes (19.39±6.99) was lower than the average score of the questionnaire (28) (*P*= 0.001, t= 11.48 (86)). The results of the t-test of a sample are shown in Table 2.

Table 1. Runes test results for examining variables of depression, anxiety, stress, event impact, emotional disorders and subscales of emotional disorders

Variable	Standard score	z Standard score	Sig.
Depression	14	-1.81	0.07
Anxiety	10	1.15	0.24
Stress	19	-2.37	0.01
IES	44	-0.18	0.85
Emotional disorders	108	0.47	0.63
Not accepting emotional responses	18	0.49	9.61
Impairment of purposeful behaviors	15	-0.95	0.33
Impairment of impulse control	18	-0.6	0.54
Lack of emotional awareness	27	1.1	0.26
Limitations on achieving emotion regulation strategies	24	-0.91	0.35
lack of emotional clarity	15	-0.65	0.51

Table 2. The results of one-sample t-test to examine the perceived stress variable

Variable	t	df	Sig	Mean	S.d	Cohens' d
Perceived stress	-11.48	86	0.001	19.39	6.99	0.8

In order to evaluate the strength and direction of the relationship between the variables used in this research, Kendall's correlation coefficient was used. There was a strong and positive correlation between depression and anxiety (τb= 0.54, *P*≤0.001), depression and stress (τb= 0.53, *P*≤0.001), moderate and positive correlation between depression and IES (τb= 0.48, *P*≤0.001), depression and emotional disorder (τb= 0.43, *P*≤0.001), anxiety-stress (τb= 0.43, *P*≤0.001), anxiety-IES (τb= 0.39, *P*≤0.001), stress-IES (τb= 0.38, *P*≤0.001) stress-emotional disorder (τb= 0.37, *P*≤0.001), and IES- emotional disorder (τb= 0.3, *P*≤0.001). Also, there was weak and positive correlation between anxiety-emotional disorder (τb= 0.24, *P*= 0.002) which was statistically significant. The results of Kendall's tau-b correlation are shown in Table 3.

Table 3. The results of Kendall's tau-b correlation

Variable	τ_b	Sig.	Variable	τ_b	Sig.
Depression- anxiety	0.54	≤0.001	Anxiety- IES	0.39	≤0.001
Depression- stress	0.53	≤0.001	Anxiety- emotional disorders	0.24	0.002
Depression- IES	0.48	≤0.001	Stress- IES	0.38	≤0.001
Depression- emotional disorders	0.43	≤0.001	Stress- emotional disorders	0.37	≤0.001
Anxiety- stress	0.43	≤0.001	IES- emotional disorders	0.3	≤0.001

4. Discussion

This study is to examine the psychological status of elite athletes during the COVID-19 pandemic. We found that there is no statistically significant difference between the level of depression, anxiety, impact of the event, and emotional disorders experienced by elite athletes with the average scores of the related questionnaires.

The high speed of transmission and spread of the COVID-19 virus, which has infected all the countries of the world in less

than a few months, has caused a health emergency throughout the world [4, 5]. What is clear from the conducted studies is that depression, anxiety, sleep disorders, and emotional disorders have increased among people during the spread of Corona [23, 24, 25, 26, 27]. According to the findings of this research, elite athletes are in good condition in the components of depression, anxiety, the impact of the event, and emotional disorders compared to other sections of society.

It seems that the subjects participating in this study, past experiences, being in high-pressure competitive situations, and previous training regarding controlling anxiety and emotions and a way to deal with depression are involved in this difference. The behavioral responses of people in stressful situations depend on the level of psychological preparation and social support obtained. The symptoms of depression and anxiety have been proven to be reduced by regular physical activity, according to a number of studies [28, 29]. Persistently contemplating unfavorable incidents may intensify anxiety feelings [30] Being physically active helps people cope with life in a way that differs from thinking negatively, which helps lessen the symptoms of anxiety and depression.

According to earlier research, athletes with greater distress tolerance scores also have lower scores for dysfunctional psychological responses, such as stress, anxiety, despair, and insomnia [31]. Also, various studies have confirmed the reduction of anxiety, depression and bad mood through exercise [32, 33, 34].

Regular aerobic exercise affects the sympathetic nervous system and the activity of the pituitary-hypothalamus axis and reduces the activity of the adrenal gland, develops adaptive responses to stressful factors. Exercise has a positive effect on mood through changes in dopamine, serotonin, norepinephrine, and painkillers receptors.

Brain-derived neuron factor (BDNF) is another neurological factor that plays a role in reducing anxiety and depression with regular exercise, especially aerobic exercise. The expression of this factor, which is the most abundant neutrophin in the brain, is increased due to exercise in the hippocampus, thus preventing the decrease in the expression of this factor after exposure to stressful environments [33, 34, 35].

The results of the present study show that there is a significant statistical difference between the amount of stress experienced by elite athletes and the average scores on the questionnaire. In fact, the findings state that athletes have experienced a moderate level of stress during the Corona era. In fact, according to the results of the studies conducted, the fear of being infected or infecting others with the disease of COVID-19, the long period of quarantine, fatigue and boredom caused by quarantine, not knowing the duration of quarantine, the unknown future of the disease, concern and financial issues, and adding some thoughts unpleasant feelings, such as feeling alone, were recognized as the most important triggers of stress [4, 5]. Individuals undergo a change in their level of psychophysiological activation when confronted with stressors. This effect takes place before the person realizes how the stressful experience has affected them [36]. In sportsmen and sportswomen, like in many other professional domains, extended and unpredictable exposure to stressful causes can set off dysfunctional reactions that carry a significant risk of psychiatric diseases or changes [34]. Sportsmen and sportswomen currently deal with a number of typical concerns, such as competition

cancellations, and frequent training stoppages because of teammates' or coaches' favorable COVID results. Athletes feel anxious about their personal life in addition to competitiveness and their athletic careers [37, 38].

Another one of the investigated components was the amount of perceived stress. The results of this research showed that there is a significant statistical difference between the average scores obtained by elite athletes and the average scores on the questionnaire. Athletes had a lower level of perceived stress than the average level of questionnaire scores.

In justifying the difference between the results of this research and Al-Rabiaah et al.'s research (2020), we can point to the studied subjects, experiences, and trainings obtained. According to the theory of resilience, it can be concluded that exercise can increase resilience in a person and, in this way, create a kind of self-regulation and self-management to deal with unfortunate and unpleasant situations and events in a person [39].

In this regard, the theory of psychological pressure states that supportive, behavioral, and cognitive resources play an important role in the degree of adaptation of people to stressful conditions and environments [1]. From a cognitive point of view, the way a person perceives and interprets the created situation, in addition to stress factors, plays an important role in a person's health [40]. Also, the theory of resilience refers to the efficient growth in the face of stressful events in life. The word resilience includes the concept of flexibility, creating an optimal state and quickly returning to the initial state after facing unfortunate and stressful events in life. In general, resilience is an approach for positive adaptation to a pathological event [40, 41].

Self-efficacy beliefs help people perform tasks and adapt in different situations, including stressful situations. Management in stressful, ambiguous and unpredictable situations depends on many skills, including self-confidence. In fact, the feeling of self-confidence enables people to do extraordinary things by using the experiences and skills acquired in the past in dealing with problems [42].

According to Connor and Davidson (2003), resilience increases people's mental health [41]. Resilience increases problem-solving ability, social ability, and a sense of purposefulness and is related to mental health by strengthening personal strength and competence. Athletes have more resilience, and this feature makes athletes experience more positive emotions and optimism compared to normal people. Therefore, it can be concluded that athletes have higher self-efficacy and mental health, which causes them to have more success in facing life's hardships and difficulties [40, 41]. The ability to manage situations, which is one of the components of resilience, helps a person and makes him better able to control the situation. Better mastery over the conditions creates the belief in the person that he has the ability to influence life situations, and in this way, he can make important changes in order to better control things [43]. Exercise helps people not feel powerless and helpless in the face of problems. People who have high self-efficacy do not feel despair and anxiety in difficult situations, do not feel defeated in the face of problems, and believe that they can successfully overcome life's obstacles [44].

Our study is not without limits. The sample used may have an impact on the results. The results may have been impacted

by the cultural diversity of each sport (such as open-air and indoor sports), different athlete groupings (such as team and individual sports), gender, and age.

To complete these findings in the upcoming research projects, it is also suggested to include cognitive and emotional characteristics (such as motivation, coping strategies, and resilience). Through new explanatory proposals or models, it will be possible to analyze the connections between temperament, cognition, and emotion in order to better understand how athletes respond functionally and adaptively to situations that have an impact on their athletic career, such as long-term injuries or sporting withdrawal.

5. Conclusions

The study's findings demonstrated that while there is a significant statistical difference between elite athletes' average questionnaire scores and the amount of stress they experience, there is no significant statistical difference between the athletes' average scores and the levels of anxiety, depression, impact of the event, and emotional disorders. possesses it. The results really show that during the Corona era, sportsmen have gone under a modest amount of stress. Since athletes are more resilient than non-athletes, they are more likely to feel optimistic and happy feelings. Thus, it may be said that athletes are more successful at overcoming obstacles in life because they have more mental and self-efficacy. People who exercise regularly feel less helpless and hopeless when faced with challenges. High self-efficacy individuals believe they can effectively overcome life's hurdles and do not experience feelings of hopelessness or fear in trying circumstances.

Conflict of interest

The authors declared no conflicts of interest.

Authors' contributions

All authors contributed to the original idea, study design.

Ethical considerations

The authors have completely considered ethical issues, including informed consent, plagiarism, data fabrication, misconduct, and/or falsification, double publication and/or redundancy, submission, etc.

Data availability

The dataset generated and analyzed during the current study is available from the corresponding author on reasonable request.

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