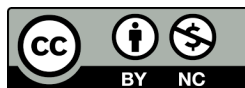# Investigating the predictive role of psychological factors in the incidence of sports injuries (musculoskeletal) of elite male volleyball players

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Article Info	Abstract
	Introduction: This study aimed to investigate the predictive role of psychological factors in the incidence of sports injuries (musculoskeletal) of elite male volleyball players. **Martials and Methods:** This was a descriptive-correlational research study design. The study was conducted with 150 elite male volleyball players in the Premier League of Khorasan Razavi province in 2020. In order to collect data, three standard questionnaires including Sports Injuries Questionnaire (Esmaeili, 2014), Personality Traits Questionnaire [18], and Competitive State Anxiety Questionnaire (CSAI-2) Rainer and Martens (1990) were used. In order to analyze the data in this study, SPSS software version 23 was used. **Results:** The results show that competitive anxiety can explain sports injuries (musculoskeletal) in the first model. In the second model, when the somatic anxiety variable is added, competitive anxiety and somatic anxiety variables can explain sports injuries. In the final model, the factors of competitive anxiety, somatic anxiety, self-confidence, risk-taking, excitement, and aggression can explain sports injuries. **Conclusion:** It can be said that psychological factors play a role in the incidence of sports injuries (skeletal-muscular) of elite male volleyball players.

1. Introduction

Most sports, including volleyball, require high physical and mental skills to manage stressful situations [1]. In a prospective study is observed that the frequency of sports injuries in elite athletes increases due to psychological factors [2]. Despite the best efforts to prevent sports injuries and increase the quality of many sports, sports injuries are an integral part of sports activities; however, there are ways to reduce the risk of sports injuries [3]. One of the methods that have attracted the attention of researchers in this decade is the diagnosis of athletes according to psychological factors related to sports injuries [4].

In this regard, significant research has focused on the factors that predict the increased risk of sports injuries in athletes, and the history of sports injuries has been reviewed in various studies [5]. These factors include physical/physiological factors (such as body composition, physical fitness), anatomical factors (such as biomechanical factors), environmental factors (such as exercise levels), and psychological factors (anxiety, depression, emotional disorder) [6, 7].

Research into the psychological history of sports injuries is rooted in the work of Holmes and Rahe (1967) [8]. Their work was based on the relationship between life events and illness stress, which revolutionized medical behavior. They found that people who had experienced more tragic events or incidents, such as the death of a friend or acquaintance and divorce, relocation, were more likely to become ill in the future. In support of Holmes and Rahe (1967) [8], evidence shows that stress weakens the immune system [9]. In 1970, Holmes used the Social Equilibrium Rating Scale as a predictor of American football injuries. Holmes found that footballers who have experienced many unfortunate events are more likely to suffer sports injuries [10]. In this regard, Bramwell et al. (1975) modified the Social Equilibrium Rating Scale in proportion to athletes' sports injuries and according to the psychological factors of American universities and used it to find that the group that experienced the most unfortunate events was more likely to suffer sports injuries [11].

Based on one of the first studies, psychological trauma prevention was conducted by Davis (2008) [12]. Using relaxation-based intervention causes a reduction in injury incidence from 33% in football to 52% for swimmers.

In the study of Haghshenas (2006), on a group of competitive university runners, athletes in the experimental group significantly reduced the number of days lost due to sports injuries or illness [13]. The results also indicated that the interfering effects were particularly mediators for negative moods. Young-eun noh (2005) showed a moderate relationship between psychological factors and the severity and duration of sports injuries [14]. Relief from anxiety and self-confidence were identified as significant predictors of the severity of sports injuries. Relief from anxiety and negative stress were also identified as predictors of the duration of sports injuries.

Johnson et al. (2005), study highlighted the usefulness of marking athletes who were at high risk for sports injuries and needed interventions [15]. Subjects in the experimental group that received brief treatment with six mental skills (such as stress management, goal setting, and relaxation) for 19 weeks of competition had significantly fewer injuries than the control group. These results confirmed by the

research of Khosravi et al. (2007) [16]. Their study showed that using a stress-management intervention for a group of athletes identified as at-risk based on previous injuries, coping, and levels of social support. The athletes in the experimental group compared with the control group lost less time due to sports injuries.

Meanwhile, individuals active in the health of athletes believe in the superiority of prevention over treatment. In the world of professional sports, due to the importance of competition and the desire of athletes to continue sports activities, the ability to predict the factors affecting injury can cause to prevent many injuries. Also, in general, the study of the predictive role of factors affecting injury and its prevention leads to the promotion of health in the sports community. Previous researches have been focused on the general role of psychological factors in sports injuries without considering the factors that have played the most crucial role in causing such injuries. For the first time, the present study investigates the predictive role of psychological factors in the incidence of sports injuries (skeletal-muscular) of elite male volleyball players.

Therefore, it is essential to study the role of psychological factors that can be used to identify at at-risk male volleyball players. Therefore, in this study, the researchers seek to investigate the role of psychological factors associated with sports injuries of elite male volleyball players. The research question is: Do the factors of competitive anxiety, somatic anxiety, self-confidence, risk-taking, excitement, and aggression can predict sports injuries (musculoskeletal) of elite male volleyball players?

2. Materials and Methods

This was a descriptive-correlational research study design. The study was conducted with 150 elite male volleyball players in the Premier League of Khorasan Razavi province in 2020. It is worth to mention that it was a statistical sample of athletes who participated in the pre-season test. In the present study, elite male volleyball players who missed at least one game due to injury were referred to as injured. In order to conduct the research, first the writing steps were performed and after determining the theoretical framework, with the presence of the researcher in the Volleyball Federation; the second stage was obtaining information about Mashhad city teams, start and end time of the top leagues, first and second divisions and supervisor phone number the head coach of the teams. Then, by attending the pre-season training of all teams, the necessary arrangements were made to determine the exact date and time of taking the tests (Questionnaires of Sports Injury, Personality Traits, and Competitive State Anxiety (CSAI-2)). During the coordination, a team of 10 people in the men's section was assembled as a research team. The necessary training was provided to standardize the implementation of the tests. All individuals were prepared to assist in the research project.

In order to collect data, three standard questionnaires of sports injuries [17], which had 30 items, the personality traits questionnaire [18], which had 48 items, and the competitive anxiety questionnaire [19], which has 27 items, were used. It should be noted that all questionnaires were adjusted based on the 5 Likert scales.

In order to analyze the research data, descriptive statistics (frequency,

percentage, mean, standard deviation, and tables) and inferential statistics (Kolmogorov-Smirnov test to check the normality of the data, regression model test, and ANOVA test) were used. The software used in this research was SPSS version 23.

3. Results

The results of describing the individual characteristics of elite male volleyball players showed that the subjects' mean age (year) was 22,067 with a standard deviation of 1.99. Also, the subjects' average height (cm) is 179.4600 with a standard deviation of 10.46 and the average weight (kg) of the subjects is 74 with a standard deviation of 5.22. Then, the information obtained from the implementation of questionnaires on the members of the research sample is descriptively analyzed. The information presented in this section includes the frequency, mean and standard deviation of the results of the questionnaires on the participants in the study (Table 1).

Table 1. Descriptive indicators of research variables

Variable	Number	Mean	SD
Competitive anxiety		15.31	4.70
Somatic anxiety		16.37	4.14
Self confidence		16.28	4.77
Risk-taking	150	14.62	4.93
Excitement		13.05	4.82
Aggression		12.13	4.37
Sports injuries (musculoskeletal)		19.42	5.63

Next, to use the regression model, it is necessary to test the assumptions of its use. For this purpose, Kolmogorov-Smirnov test was used to determine the normality of the data, the results of which indicate the normality of the distribution of research variables, and therefore parametric tests can be used. As Table 2, the competitive anxiety variable explains more than 0.08% of the common variance of sports injuries (musculoskeletal) and when the somatic anxiety variable is added to it, this value reaches 0.11% and finally, when the aggression variable is added, this value reaches 0.29%.

Table 2. Summary of the regression model

R	R^2	The square of the correlation coefficient	Standard error of the estimate	Durbin-Watson statistic
0.30	0.09	0.08	5.37	
0.34	0.12	0.11	5.30	
0.39	0.15	0.13	5.22	
0.45	0.20	0.18	5.07	1.52
0.46	0.21	0.19	5.06	
0.56	0.32	0.29	4.72	

As Table 3, analysis of variance in the first step confirms the validity of stepwise regression analysis in predicting sports injuries (musculoskeletal) ($P<0.05$, F=15.325). Also, analysis of variance in the second step confirms the validity of stepwise regression analysis in predicting sports injuries (musculoskeletal) ($P<0.05$, F=10.209). In the third step, the validity of stepwise regression analysis in predicting

sports injuries (musculoskeletal) is confirmed ($P<0.05$, F=9.013). In the fourth step, the validity of stepwise regression analysis in predicting sports injuries (musculoskeletal) is confirmed ($P<0.05$, F=9.511). In the fifth step, the validity of stepwise regression analysis in predicting

sports (musculoskeletal) injuries is confirmed ($P<0.05$, F=7.979). In the sixth step, the validity of stepwise regression analysis in predicting sports injuries (musculoskeletal) is confirmed ($P<0.05$, F=11.374).

Table 3. ANOVA test results

Total squares	DF	Average sum of squares	F	*P*-value
442.77	1	442.77		
4276.05	148	28.892	15.325	0.001
4718.83	149			
575.50	2	287.750		
4143.33	147	28.186	10.209	0.001
4718.83	149			
737.35	3	245.875		
3981.47	146	27.270	9/013	0.001
4718.83	149			
980.76	4	245.190		
3738.07	145	25.780	9.511	0.001
4718.83	149			
1023.71	5	204.743		
3695.11	144	25.661	7.979	0.001
4718.83	149			
1524.46	6	254.078		
3194.36	143	22.338	11.374	0.001
4718.83	149			

As Table 4, in the first model, competitive anxiety can explain sports injuries (musculoskeletal) ($P<0.05$). In the second model, when the somatic anxiety variable is added to it, competitive anxiety and somatic anxiety variables explain sports injuries (musculoskeletal) ($P<0.05$). In the final model, the factors of competitive anxiety, somatic anxiety, self-confidence, risk-taking, excitement and aggression can explain sports injuries (musculoskeletal) ($P<0.05$). Therefore, the results indicate that psychological factors have the ability to predict the sports injuries (musculoskeletal) of elite male volleyball players.

4. Discussion

According to the results, it was found that

"psychological factors can predict the sports injuries (musculoskeletal) of elite male volleyball players." The results showed that the factors of competitive anxiety, somatic anxiety, self-confidence, risk-taking, excitement and aggression could explain sports injuries (musculoskeletal). These results are in line with some researches [20, 21, 22, 23, 24, 25, 26, 27].

Although early research on stress and sports injuries has led researchers to find that there is a straight forward relationship between stress and sports injuries, recent research has shown that this is not the case and the relationship between sports injuries and psychological factors seems to be a complex one with countless variables that affect its outcomes.

Table 4. Regression analysis results

Model		Non-standardized coefficients		Standardized coefficients	T	P-value
		Standard error	B coefficient	Beta		
1	(Constant)	25.049	1.500		16.697	0.001
	Competitive anxiety	0.36	0.094	0.306	3.91	0.001
2	(Constant)	22.744	1.823		12.47	0.001
	Competitive anxiety	0.52	0.11	0.44	4.44	0.001
	Somatic anxiety	0.29	0.13	0.21	2.17	0.03
3	(Constant)	23.983	1.864		12.86	0.001
	Competitive anxiety	0.42	0.12	0.35	3.41	0.001
	Somatic anxiety	0.39	0.14	0.29	2.85	0.005
	Self-confidence	-20.28	0.11	-0.23	-24.43	0.016
4	(Constant)	22.708	1.859		12.21	0.001
	Competitive anxiety	0.492	0.123	0.411	4.001	0.001
	Somatic anxiety	0.381	0.136	0.281	2.806	0.006
	Self-confidence	-0.400	0.118	-0.339	3.381	0.001
	Risk-taking	0.311	0.101	0.272	3.073	0.003
5	(Constant)	23.028	1.871		12.305	0.001
	Competitive anxiety	0.518	0.124	0.432	4.164	0.001
	Somatic anxiety	0.362	0.136	0.267	2.660	0.009
	Self-confidence	-0.450	0.124	-0.382	-3.623	0.001
	Risk-taking	0.234	0.117	0.205	1.993	0.04
	Excitement	0.177	0.137	0.152	1.294	0.01
6	(Constant)	24.828	1.787		13.894	0.001
	Competitive anxiety	0.311	0.124	0.260	2.510	0.01
	Somatic anxiety	0.394	0.127	0.290	3.093	0.002
	Self-confidence	-0.648	0.123	-0.549	5.257	0.001
	Risk-taking	0.320	0.111	0.280	2.882	0.005
	Excitement	0.493	0.144	0.423	3.421	0.001
	Aggression	0.630	0.133	0.489	4.735	0.001

In the last decade, the marking of athletes at high risk of injury has been developed based on psychological indicators (for example, athletes with low social support and high stress). Researchers believe that personality traits and psychological factors can be used to identify athletes at risk for injury and to use appropriate strategies to prevent injury, but there is still limited scientific knowledge and research in this area. In this regard, they have not yet been able to fully elucidate the mechanisms behind the relationship between psychological factors and trauma.

Personality traits and excitement variables about personality and positive mental states are known as predictors of sports injuries. Sahib Al-Zamani (2005) in the study of 425 male and female high school athletes from various sports, except athletes with low emotional status variables, found a positive relationship between exercise-related stressors and lost time [28]. He hypothesized that too much excitement would cause more harm. Positive mental states, the ability to experience positive states, such as maintaining focus, talking to others, and being comfortable are associated with the risk of injury. Taleb (2014) showed that athletes who were able to experience more positive mental states were less likely to be

injured [29]. He hypothesized that the presence of assertive personality behaviors, such as stubbornness, can predict the athlete for aspects of sporting situations such as less threatening and belligerent, leading to fewer stress responses and less risk of injury. Other behaviors, such as competitive anxiety, can be thought of as predisposing athletes to develop more pronounced stress responses in competitive situations, and as a result, the risk of injury may increase.

Athletes who suffer from physical injuries are exposed to psychological damage, especially mental health and low self-esteem, which can affect and disrupt the sports process, daily life, interpersonal relationships, quality of life, and in a word, the injured person's daily life. Overall, this study aimed to investigate the predictive role of psychological factors in the incidence of sports (skeletal-muscular) injuries of elite male volleyball players. The results showed that injured athletes in sports stress, anger and aggression scored significantly. Explaining that injured athletes developed higher anger and aggression, it can be said that high levels of anger and aggression cause the athlete to lack balance and concentration during the game and to suffer more injuries. This finding is consistent with O'leary (1990) who states that anger and aggression make athletes more vulnerable to injury [9].

These findings are also consistent with Abdoli (2016) who entitled Predicting Psychological Factors of Injury among Elite Athletes named anger, confusion, fatigue, stress, and depression [30]. The findings of the present study in the field of competitive anxiety show that competitive anxiety, which is more common in injured athletes, is one of the consequences of professional sports. According to the available evidence,

they increase and the amount of concentration and control of movements decrease and the probability of injury increases. On the other hand, sport is a place where one can challenge oneself and taste the sweetness of victory by participating in and choosing real, challenging and achievable goals, but athletes who have low goal orientation or are afraid of defeat and competition are fully prepared and they do not put maximum energy on the field and this fear. Also, low energy will make them prone to any injury. So, before the actual start of the competition, the athlete must be mentally prepared to face opponents and depending on his goals try and reduce his/her injury.

According to the results of the study, the rate of physical, cognitive, behavioral symptoms and generally physical anxiety in injured people is high. These results, which are in line with the results of Qarakhanlu et al. (2016) [31] as well as the findings of Kangarloo et al. (2011) [32], can be explained by the fact that players with high anxiety are more exposed due to low concentration, low balance and lack of self-control and wrong decisions, and injuries and the percentages of different injuries are higher in them. In general, it can be said that high vitality and athleticism reduce injury and high anger and aggression and high anxiety increase the injury of athletes. This increases the importance of having a psychologist and identifying and knowing the psychological characteristics of athletes, and these psychological skills should be considered along with physical exercise.

5. Limitations
This study has a few limitations. The first limitation of this study was the use of a questionnaire to collect data. These tools usually collect answers that others think

should be correct, and people may try to look for the right answers or show themselves to be better than they really are, which somewhat reduces the accuracy of the results. However, to avoid diminishing the accuracy of the results, elite male volleyball players were told that there was no right or wrong answer in the questionnaires, and the best answer was one that indicated their true status. Another limitation of the correlational research method was due to the inability to express causal relationships.

6. Conclusions

According to the research findings, if special attention is paid to psychological factors in athletes, especially elite and professional athletes, it is possible to prevent injuries (musculoskeletal) in these people and athletes with proper mental conditions led to sports competitions. Also, one of the factors that can be effective in this field is the presence of a sports psychologist along with these athletes and sports teams who regularly guide them and prepare them for a strong presence in sports competitions.

Conflict of interest

The authors declared no conflicts of interest.

Authors' contributions

All authors contributed to the original idea, study design.

Ethical considerations

The author has 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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