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The Effect of Impulsivity Level on Performance Indicators of Beginner Volleyball Players

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***Abstract*— Impulsivity affects cognitive and behavioral aspects. Because in volleyball, the player must decide at the moment and implement its skill, and most of the outcome (outcome) of his performance is functional of his correct decision, his impulsive level can be important. The main purpose of this research was to compare the performance indicators of beginner volleyball players with different impulsivity levels based on Bart (2004). The statistical population of this study was volleyball player girls at Karaj clubs. Among these people were selected by about 300 people. The data gathering tool was Bart's impulsivity questionnaire (2004), Duda and Nicholls Sport Questionnaire (1992) and coach checklist, which measures the indicators of error number and risk of riskaceability. In order to test the hypotheses one-way multivariate analysis of variance (MANOVA) and at a significant level of 0.05 were used with SPSS software. According to the results of this study, there is a significant difference between the high, low and moderate levels in the risk level of players, the number of errors and the sports success of volleyball players. But there was no significant difference between high, low and moderate levels for technical performance of players (1 to 10 questions of instructor checklist including fitness, receiving, pass, defense, reaction time, game intelligence, etc.). In the sports variable, players with high impulsivity players had a significant difference with players with low and moderate impulsivity levels, but there was no significant difference between moderate and low levels in sport success. In variables of risk and number of errors, low impulsivity players had a significant difference with players with high and moderate impulsivity levels, but there was no significant difference between high and moderate levels in riskaceability and error number.**

Keywords*— *impulsivity, risk level, sports success, error number, volleyball

Introduction

Sports performance is influenced by various factors, including physical, psychological and technical icons. The relationship between different characteristics with the function of athletes has long been considered by researchers long, but still finding indicators that can improve directly or indirectly the athlete's performance, it has attractive and importance for coaches. Identification of the role of physical

variables has been studied enough in various fields of sports sciences, but the study of psychological indicators affecting exercise performance is less investigated. Different sports fields depend on the nature of the field, the environment that is performed and the individual characteristics of the athlete, in a variety of ways, are influenced by the psychological characteristics of the athlete (1).

High-level performance requires that the athlete has a favorable control over its functional resources. In volleyball, due to the need for accuracy and speed, more techniques that should be implemented during the competition and the importance of decision making in the rate of success, the impact of indicators Psychologically special importance (2). One of the indicators that play an important role in decisions during the game is impulsivity. The impulsivity is typically an inability to wait, the preference for high-risk results, expresses tendency to action without measurement, lack of sensitivity to the consequences and / or inability to prevent inappropriate behaviors (3). Impulsivity is one of the determinant features that affect motor function and learning. Impulsivity is a pattern of behavior that manifests itself in various forms. Bart, for example, suggests that three classes in impulsivity include; There is movement (thoughtless action), attention (lack of focus on the task at hand) and unplanned (focus on presenting future results without account) (4, 5). All three impulsive categories introduced by Barthes can have specific functions in open sports skills such as volleyball. Besharat et al., (2014) showed that there is a positive correlation between the dimensions of impulsivity and sports success in collision sports athletes and the sports success of players can be predicted in terms of motor and cognitive impulsivity (6). Eysenck et al. (1993) characterized impulsivity with unplanned risky behaviors and rapid and hasty arrangement of the mind, and considered impulsivity in relation to risk-taking, lack of planning, and quick decision-making (7). Giustiniani et al. (2019) showed that impulsivity is an important element in the decision-making process and impulsivity is associated with risk-taking and lack of reflection between environmental stimuli and behavioral response when making decisions (8). According to the findings of Tzagarakis et al. (2013), participants with high levels of impulsivity had greater errors in their performance (9).

When deciding to perform motor skills, human information processing takes place in both overt and covert ways. In the obvious method, it means that the processing is conscious, controlled and conscious, and it is more of a chain method. In the hidden method, unconscious processing is automatic and direct and provides the possibility of parallel processing (10). These two different information processing systems are directly affected by impulsive behaviors. Given that impulsivity in conditions of arousal and activation can affect self-control, so impulsivity is one of the characteristics that can be effective for the quality of decisions and ultimately the performance of athletes. Because impulsivity affects the cognitive and behavioral aspects, and given that in volleyball, the player must decide in the moment and apply his skill, and much of the final result (consequence) of his performance depends on his correct decision, the level his impulsiveness can be significant. Impulsivity, especially in sports with a changing environment (open skill) such as volleyball, plays a key role in optimizing performance by influencing attention needs and decision making. In this regard, the difference between information processing systems and other psychological factors can play a special role. Individual differences between athletes with different skill levels can also affect the athlete's technical performance along with other factors. Research findings have shown that there is a significant relationship between impulsivity and athletic proficiency (11) and participation in competitive sports that require momentary decisions during the game probably requires an optimal level of impulsivity. Impulsivity plays a role in open and closed skills (10) and in collision and non-collision sports (12) and is one of the effective factors in determining the success of athletes (12). Play post in team sports also requires different levels of impulsivity (10). Even impulsivity at a lower level than competitive sports and in the field of physical activity has played a significant role (13).

Despite many studies on impulsivity and related bio-psychosocial variables in recent years, many questions remain unanswered. Various studies in different contexts have examined the role of impulsivity in learning and performing sports skills. For example, Lage et al. (2011) observed a significant

relationship in handball (14). The present study intends to compare the performance of people with different levels of impulsivity in another way and with a causal-comparative method to clarify the possible differences between people with different levels of impulsivity. Since no such comparison has been made in volleyball and volleyball, unlike handball, is a non-collision sport, the present study was conducted to compare the performance indices of beginner volleyball players with different levels of high, medium and low impulsivity.

Methodology

The present study has a descriptive strategy and a causal-comparative design whose data were collected by questionnaire and non-clinical method. The current statistical population is beginner female volleyball players who have attended volleyball training in Karaj clubs and have at least three years of experience in specialized volleyball training and education. About 300 people were selected from these available people and participated in the study voluntarily. After fulfilling the conditions for entering the research, the subjects were placed in one of the high, medium and low impulsivity groups based on the scores obtained from the impulsivity questionnaire, and then the questionnaires related to measuring the research variables were completed online by the players. In this study, Barratt (2004) questionnaire was used to measure the impulsivity variable (4). This questionnaire includes 30 items and three subscales including unplanned, motor impulsivity and cognitive impulsivity. Previously, Besharat et al. (2007) and Javid et al. (2012) have confirmed the validity and reliability of this tool (15). Also, to evaluate the technical performance of the players in this study, based on previous studies, forms and tests were used to evaluate the performance of the players. Accordingly, for the field of volleyball, according to previous studies (2), the desired variables were extracted and checklists were compiled and used, and based on the opinion of volleyball experts, its formal validity was confirmed. Also, the convergence validity coefficient was calculated for this questionnaire and then its reliability was calculated using Cronbach's alpha coefficient and SPSS software, which was 0.829, so considering that it is more than 0.7, the questionnaire has the necessary reliability. In addition, Duda and Nicholls self-report questionnaire, 1992, was used to measure the variable of sports success, which has 13 questions and two dimensions of task orientation (7 questions) and self-control (6 questions). The mentioned questionnaire has already been used by Shamshiri (1373) on student-athletes in Tehran and Keshtmand (1383) on student-athletes in Kermanshah and Bahrami, Yousefi (1383) on wrestling athletes in Lorestan province and has been validated and reliable (16, 17). It has also been validated using Cronbach's alpha and has been reported at 0.8%. In this study, multivariate analysis of variance (MANOVA) was used and a significance level of 0.05 was determined.

Results

According to the results of descriptive statistics and demographic characteristics of the participants in this study, most participants (about 61%) were in the age range of 15 to 20 years. More than half of the participants had more than 3 years of experience in this sport. Also, 28% of the players participating in the passer activity and most of them (37%) were 161 to 170 cm tall. 31% of them weighed between 61 and 70 kg.

For cognitive impulsivity, most participants chose the option most often (52%). For motor impulsivity, the highest frequency was sometimes related to the option (78%). For non-planning, the option was often

the most frequent (80%). Impulsivity level of most participants (92%) was moderate, 5% had low impulsivity level and only 3% of participants had high impulsivity level.

Table 1 shows the descriptive characteristics of the research variables.

Table1. Descriptive properties of variables

Variables	Impulsivity level	Mean	Standard deviation	Number
Sports success	Down	3.93	.258	15
	medium	3.91	.557	277
	Top	4.50	.535	8
	Total	3.92	.552	300
Number of technical errors	Down	3.13	1.125	15
	medium	2.76	1.117	277
	Top	2.25	1.282	8
	Total	2.77	1.124	300
Risk level	Down	3.00	.378	15
	medium	2.56	.687	277
	Top	2.50	.756	8
	Total	2.58	.682	300
Technical performance of players	Down	3.20	.775	15
	medium	3.26	.792	277
	Top	3.38	.744	8
	Total	3.26	.788	300

To investigate the hypothesis of homogeneity of the covariance matrix, the Mbox test was used and the results of this test are presented in Table 2. The null hypothesis in this test is the homogeneity of the covariance matrix of the dependent variables. According to the obtained result (p-value> 0.05), the hypothesis of zero confirmation and homogeneity of the covariance matrix of dependent variables is confirmed.

Table2. Mbox test results

Box's M	28.513
F	1.188
df1	20
df2	1504.028
Sig.	0.256

Table 3 shows the results of the Leven test to examine the equality of variances in different groups:

Table3. levene test results for equality of variances

Variables	levene	df1	df2	p-value
Sports success	2.906	2	297	.056
Number of technical errors	.295	2	297	.745
Risk level	3.707	2	288.526	.226

Technical performance of players	.040	2	297	.961

Given that the p-value is greater than 0.05, so the assumption of equality of variances is confirmed.

Table 4 presents the results of multivariate analysis of variance (MANOVA) statistical test:

Table4. Results of multivariate analysis of variance on the mean scores of the studied variables

Variable	the amount	F	Hypothesis df	Error df	p-value	Eta Squared
Impulsivity	.945	2.094[b]	8.000	588.000	.035	.028

As can be seen in Table 4, in the second row, the result of the Wilkes lambda test is shown. In this table, the p-value is equal to 0.035, which is less than the alpha value (0.05) and is therefore significant. In other words, the effect of impulsivity level group on the linear composition of dependent variables is significant (p-value <0.05). This test allows the use of multivariate analysis of variance and shows that there is a significant difference between at least one of the variables in players with high, medium and low level of impulsivity. The square of Eta shows that the difference between the three groups with respect to the dependent variables is significant in total and the amount of this difference is approximately 28%.

Table5. Results of multivariate analysis of variance on the scores of dependent variables in players with high, low and medium impulsivity

Variables	df	Mean Square	F	p-value	Eta Squared
Sports success	2	1.372	4.604	.011	.030
Number of technical errors	2	2.079	1.654	.033	.011
Risk level	2	1.427	3.108	.046	.020
Technical performance of players	2	.080	.128	.880	.001

According to Table 5, a value of 0.88 for p-value and F = 0.128 shows that the level of impulsivity has no significant effect on the dependent variable of technical performance (p-value> 0.05). Therefore, the results of the first hypothesis do not confirm and there is no significant difference between the technical performance of beginner volleyball players with high, medium and low level of impulsivity. There is a significant difference between the risk level of players with high, medium and low level of impulsivity, in other words, the level of impulsivity has a significant effect on the dependent variable of risk level (p-value <0.05) where F = 3.108, p-value = 0.046 and the effect size is 0.02, so the null hypothesis is rejected and the second hypothesis of the research is confirmed. There is a significant difference between the number of technical errors of players with high, medium and low level of impulsivity, in other words, the level of impulsivity has a significant effect on the dependent variable number of technical errors of players (p-value <0.05) where F = 1.654, P-value = 0.033 and the effect size is 0.02, so the null hypothesis is rejected and the third hypothesis of the research is confirmed. There is a significant difference between the sports success of players with high, medium and low level of impulsivity, in other words, the level of impulsivity has a significant effect on the dependent variable of sports success of players (p-value <0.05) where F = 4.604 and p -value = 0.011 and the effect size is 0.03, so the null hypothesis is rejected and the fourth hypothesis of the research is confirmed.

Discussion and conclusion

The aim of this study was to compare the performance indices of beginner volleyball players with different levels of impulsivity based on Bart's theory. In this study, impulsivity as a behavioral model based on Barratt (2004) model in three levels of movement (thoughtless action), attention (lack of focus on the current task), and lack of planning or unplanned (focus on presentation without Account of future results) was examined (4). In general, the results of this study showed that there is a significant difference between the participating players with different levels of impulsivity (high, low and medium) in the variables of sport success, number of errors and risk. The difference was that in the sports success variable, players with high levels of impulsivity had a significant difference with players with low and medium levels of impulsivity, but there was no significant difference between average and low levels of sports success and they acted the same. In the variables of risk level and number of errors, players with low level of impulsivity had a significant difference with players with high and medium levels of impulsivity, but between high and medium levels in the amount of risk and number of errors were not observed and acted the same. The results of this study indicate that impulsivity affects the cognitive and behavioral aspects, therefore, given that in volleyball, the player must decide at the moment and apply his skill, and most of the final result (consequence) of his performance. It depends on his correct decision, his level of impulsivity can be important.

The following are the results of rejecting or confirming each of the research hypotheses:

Hypothesis 1: There is no significant difference between the technical performance of beginner volleyball players with high, medium and low level of impulsivity:

The results of rejecting the main hypothesis of the research are not in line with the findings of Ghahramani et al. (2015), because they showed that football players in different positions, goalkeeper, defender, midfielder and striker have different levels of impulsivity (10). This can be the result of years of practice based on post-game requirements and the need for cognitive processing and decision-making in various positions. According to Table 4, there is a significant difference between the risk level of players with high, medium and low level of impulsivity.

Hypothesis 2: There is no significant difference between the risk level of beginner volleyball players with high, medium and low level of impulsivity during the game:

The results of confirming the second hypothesis are consistent with the research of Giustiniani et al., (2019) they also showed that there is a strong and negative relationship between impulsivity and risk-taking (8). Also, according to Eysenck et al. (1993), impulsivity is characterized by unplanned risky behaviors and rapid and hasty arrangement of the mind and impulsivity is considered in relation to risk-taking, lack of planning and quick decision-making (7).

Hypothesis 3: There is no significant difference between the number of technical errors of beginner volleyball players with high, medium and low level of impulsivity during the game:

The results showed that there is a significant difference between the number of technical errors of players with high, medium and low level of impulsivity. The results of confirming this hypothesis are in line with the findings of the research of Lage et al. (2011). They showed that there is a significant relationship between impulsivity test scores and mistakes made, mistakes made and offensive mistakes in handball (14). The difference in the variables of risk level and number of errors in different levels of impulsivity can be explained by the fact that when accuracy and planning in performing movements and paying attention to sensitive situations, can reduce risk and error rate in the game. Players with high impulsivity will lack performance techniques in competitive back-and-forth positions, which in most cases require high precision with limb coordination and agility and a strong focus on movement patterns. , Because they need to think and react quickly and accurately, so reducing the level of impulsivity increases the

amount of error and risk. Chamberlain and Sahakian (2007) also showed that impulsivity is characterized by a failure to control an impulse that is potentially dangerous to the individual or those around her.

Hypothesis 4: There is no significant difference between the sports success of beginner volleyball players with high, medium and low level of impulsivity:

According to Table 4, there is a significant difference between the sports success of players with high, medium and low level of impulsivity, in other words, the level of impulsivity has a significant effect on the dependent variable of sports success of players. The results of this finding are in line with the findings of Reeve (2007) and Besharat et al. (2014). Reeve showed that impulsivity had a significant relationship with participants' gender, SAT, tested items, success items, and not with race, age, and accuracy (18). According to the findings of Besharat et al., In athletes of collision disciplines, impulsivity and in athletes of non-collision disciplines, self-regulation is one of the determinants of sports success. Peltola (1992) also showed that by identifying the characteristics of athletes of different levels, the ground is prepared for guiding and growing athletes towards peak performance. The difference in the variable of sporting success at different levels can be explained by the fact that the time limit for organizing the performance and skills of players in the successful implementation of different positions in volleyball requires timely decisions and quick reactions. Increasing this skill will increase the success of the player's sport. Also, considering the effect of the level of impulsivity on the success of players, it can be said that in addition to physical and tactical abilities and specialized skills, abilities and personality traits are undoubtedly one of the factors affecting the success and development of sports. It is suggested that in addition to the talent identification stage, the level of impulsivity, as one of the indicators of players' performance, be periodically evaluated to determine the current status of athletes. In fact, by identifying players at higher levels of impulsivity, the ground for their growth and guidance is provided and the loss of capital and frustration of athletes is prevented.

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