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The Effect of Mental and Physical Training on Metacognitive Beliefs and Sports Performance of Elite Karate Athletes

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ABSTRACT

Background: The purpose of this research was the effect of mental and physical training during the training period on the metacognitive beliefs and sports performance of elite karate athletes. **Methods:** The statistical population of all the elite karate practitioners of Mashhad was between 17 and 20 years old, and 30 karate practitioners were randomly replaced in two groups of 15 people, physical-psychological training and control. The current research was of semi-experimental type and pre-test-post-test research design with control and experimental groups. In order to collect data, sports performance questionnaires and metacognitive beliefs (McQ_30) were used. After filling the questionnaires in the pre-test, the exercise program was implemented for 14 sessions of 90 minutes (every other day) for each group. During this period, the physical training group (control) only did physical training and did not receive any mental training. After the training sessions, the questionnaires were completed again. Analysis of covariance (ANCOVA) method was used to test the hypotheses. **Results:** The findings showed; Mental and physical exercises have a positive effect on the metacognitive beliefs and sports performance of elite karate athletes and have improved the cognitive beliefs and sports performance of the athletes. **Conclusion:** The conclusion is that the use of technical staff who are proficient in the field of sports psychology and training systems in all stages of an athlete's life can. In addition to the health of a sports community, it should lead the youth towards public sports and eventually become a champion athlete with a strong physical and psychological approach.

1. Introduction

Since sports success is the main goal of championship sports, it is necessary; To investigate the influencing factors more specifically; These mental processes are related to increasing the ability of athletes to choose and encourage them to perform healthy behaviors during the life cycle and reduce the perceptions that make exercise difficult for the individual and as a result, increase healthy behaviors such as; exercise and its continuation (Kelly et al., 2011). Physical training and mental skills training improves performance, increases pleasure, or achieves greater satisfaction. In fact, mental exercise is the use of senses to create or recreate an experience in the mind. Various factors play a role in human learning, including physical and mental training and transfer of skills. On the other; Physical exercise is one of the most important factors to achieve the highest performance. Vakilzadeh (2020), in a research that compared the effect of traditional mental, Pettlep and physical training methods on learning basketball free throw skills, Emphasizes the importance of high performance. Statistical analysis showed that; Pettlep's mental training group had a significant difference compared to physical training, therefore; According to the results of the research, mental training is more effective than physical training. In addition to physical training, mental skills training also improves performance, increases pleasure, or achieves greater satisfaction. Practical exercises are one of the most important methods of teaching and transferring movement skills. Of course, for better conclusions and as a complementary factor, the use of mental exercise has been suggested, which deals with using all the senses in visualizing or re-creating an experience. One of the mental skills that has received more attention is mental training. Mental training and relaxation based on mental imagery by reducing physical anxiety and sympathetic activity, the amount of secretion It reduces cortisol (Coimbra et al, 2021). In recent decades, psychological scientists have provided different definitions of mental exercise, including mental imagery as the use of senses to recreate or create an experience in the mind. In this regard; Chavoshian et al. (2015), in a research titled investigating the effect of physical training arrangement and mental imagery of variable Pettlep on the acquisition and learning of basketball shooting skills, came to the conclusion that There is an interaction between the actual execution of the action and the mental imagery of the movement, and countless studies show this similarity. However, some studies have shown that mental training, which is used as motion imagery for motor learning, usually leads to less learning than physical training. Today, many researchers believe that the depicted actions are very similar to the real movements of those actions. Researches that include brain mapping techniques point to similar active areas of the brain that are active during the creation of real movements and their

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imaging. In fact, imaging is a process through which actions are planned like natural movements, but its execution is prevented. According to this point of view, at least part of learning can be related to the process of visualizing movement planning in the absence of movement execution. Some researchers believe that mental training, like physical training, improves movement skills; because both have a common mechanism to develop movement behaviors. Gudas (2017) states in his research mental exercise can be just as beneficial as physical exercise. In recent years, many types of imaging techniques have been used in sports. Words such as mental training, positive thinking, visualization of success, visual motor behavior training, cognitive behavior modification and visualization have been used to describe products such as changes in thoughts, feelings, attention and performance. Lestariani et al. (2020) believe that; In order to accurately check the sports performance of the players, it is not enough to evaluate the result goals only, and one should pay attention to the process goals as well. In these goals, the performance of the players is more emphasized in performing the performance components during the game, and the coaches use these components to evaluate the sports performance of a player or a team and also compare the performance of the players with each other. In this regard; the research results of Van Yaperen (2010) and Johnson (2004) showed that; the optimal performance of players is related to their ability in mental skills. Being equipped with psychological skills enables people to continue their activities to achieve peak performance. On the other hand, Esfahani, Qezel Seflo (2013), in the research they conducted on champion karate athletes, concluded that; the mental skills of sports imagery, concentration, and mental energy level respectively have the greatest impact on the performance of karate athletes, and athletes who have different levels of performance probably have different levels of mental skills. Mental training is one of the most important mental abilities. Khanjari et al. (2013), during a research, state that Mental preparation exercises and psychological skills bring countless benefits to athletes and teams, but ordinary athletes stay behind because they think they don't need it and often laugh at such exercises. Researchers believe that; perhaps metacognitive beliefs can be effective in achieving sports victory for athletes; however, the influence of success in sports on the components of metacognitive beliefs can differ based on the level of ability (Jackson, 2021). Many researches have confirmed the importance of cognitive and metacognitive strategies in increasing the motivation of learners to improve (Shamsipour et al., 2016). Mental processes are different from each other by increasing the skill of athletes to select and encourage them to perform the right behaviors during the life course of metacognitive knowledge and metacognitive awareness. Researches have shown that; mental exercise is a suitable tool for obtaining mental peace, better realization of learning and making appropriate changes in movement behaviors (Cithambarm, et al, 2021). In this regard; Mashhadi Ramezani (2017) investigated the effect of a mental-physical training program on perceptual-motor performance and creativity of judo students in a research. The results showed that; integrated mind-body exercises had a significant effect on the two variables of hand-eye coordination and creativity and the combination of physical exercise and mental exercise improves motor and cognitive skills. Today, experts believe that coping with stress and reducing the pressure of training and competition play a significant role in improving the performance of athletes (Low, et al, 2023). For this purpose, several methods have been suggested, and the methods of mindfulness, muscle relaxation, and mental imagery are among the most important practical and useful methods. In general, it can be stated that most of the studies conducted in this field have generally emphasized the comparison of the effect of mental and physical exercises on the stress of athletes, and few studies have been conducted in relation to metacognitive beliefs of athletes. Therefore, in the present study, it is designed to identify the effect of physical and mental training on metacognitive beliefs and improve the performance of athletes (Laya et al, 2021). Recently, the attention of some movement learning researchers has been focused on methods such as providing several skills in one training session and changing the training. One of the important features of training that increases the probability of success; Variability in one's training experiences. The theories of motor skill learning emphasize the usefulness of changeable training. Schmidt, in his schematic theory, considers the changeability of training to be the key to the successful execution of skills. Variable exercise refers to variety of movement and variety of background parameters. While fixed exercise is an exercise in which only one movement is performed among the movements in a movement class. The main goal of physical training is to increase the athlete's physiological capacity and develop bio motor capabilities to the highest standards. On the other hand, by examining the relationships between the variables discussed in the present research, it is possible to make targeted planning to achieve success in the country's sports and improve the competitive level of the athletes and produce an important change in the country's sports. The findings of this are of particular importance in order to identify the factors affecting performance and to identify the psychological needs of karate athletes.

Considering the above, it can be stated that; many studies have been done on the effect of mental training along with practical training in order to accelerate the learning rate in movement and sports skills, but its application and impact in martial skills are not yet known properly. So; in this research, the researcher is trying to answer these main questions: Does mental and physical training during training have an effect on the metacognitive beliefs and sports performance of elite karate athletes?

2. Materials and methods:

2.1. Subjects

The current research is semi-experimental and quasi-experimental. From this community (all the elite karate practitioners of Mashhad were between the ages of 17 and 20 years old, with at least three years of continuous activity in the field of karate), 30 karateka were selected purposefully and according to the criteria of the study and were randomly replaced in two groups of n=15, physical- mental exercise (PME) and control. The desired criteria for selecting samples include; Participation in provincial competitions during the past year, history of 3 years of continuous activity in the field of karate, age range 17 to 20 years, no physical illness and no use of special medicine.

2.2. Apparatus and task

Sports Performance Questionnaire: Charbonneau, Barling and Kilway (2001) Sports Performance Questionnaire was used to evaluate athletes' performance. The questionnaire has five questions on a Likert scale and is designed to evaluate the performance of athletes and is completed by the respective coach of each athlete.

Metacognitive Beliefs Questionnaire (MCQ-30): This questionnaire was developed by Wells in 1997, which is a 30-item self-report scale that measures people's beliefs about their thoughts. The answers to its questions are on a 4-point Likert scale. And this scale has 5 subscales including: 1. Positive beliefs about worry 2. Uncontrollable and dangerous beliefs of worry 3- Beliefs of cognitive competence or cognitive adequacy 4. General negative beliefs 5. Cognitive self-awareness.

2.3. Procedure

Then the subjects voluntarily signed a written consent form during the research stages. Then the samples were randomly replaced in two groups of physical-psychological exercise and control. In the present study, a 14-session exercise program of physical and mental exercises was designed as described below and all the subjects started to do it. The implementation steps were as follows:

1. First, sports performance and metacognitive beliefs of athletes were measured by questionnaires (pre-test);

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2. Training program for 14 sessions of 90 minutes (every other day). Each group did their respective exercises according to their schedule. During this period, the physical training group (control) only did physical training and did not receive any mental training.

3. At the end of the 14th training session, the performance and metacognitive beliefs of the athletes were re-measured as in the pre-test phase (post-test).

Physical exercise protocol

The physical exercise protocol was implemented as follows. These exercises include:

540 meters run: The distance of 540 meters is determined on a suitable surface. This distance is used as the start line and the end line. The volunteer stands behind the starting line and walks 540 meters with the start command.

Explosive leg strength with vertical jump test: the athlete dips his fingertips in plaster and stands at a distance of 15 cm from the wall so that the shoulder of the upper hand (right or left) is towards the wall. He marks the highest place on the wall by raising and stretching his hand. Then he jumps upwards and marks the highest point on the wall with his fingertips. The distance between these two marks determines the amount of vertical jump or the athlete's record in this test, which indicates the athlete's muscle strength.

36 meters (40 yards) speed test: At the starting line, the athlete must be ready to go with bent knees and start running at maximum speed towards the end of the track with the start command. After crossing the finish line, the time indicated by the timer is recorded.

Agility training: the athlete stands behind the starting line and starts running with the start command. After reaching the end of the track, he picks up one of the sticks, returns to the starting line and places it on the ground behind the line and does the same action for the second time; But in the return, he does not need to put the second stick on the ground and he crosses the line at the same speed. The time between start and end is recorded in seconds.

***Sit ups*:** the athlete lies on his back, bends his knees and places the soles of his feet on the floor. He puts his hands crossed on his chest, his left hand on his right shoulder and his right hand on his left shoulder. He contracts his stomach, then lifts his head, shoulders and chest up towards his knees so that only his seat and soles of his feet remain on the floor. Then it starts with the word start which coincides with pressing the stopwatch button. This movement is performed in one minute and is recorded as a measurement scale.

Jump length: a line is drawn on the ground and the athlete stands behind it. He should jump forward and lengthwise as much as he can. The landing place of the heels to the drawn line determines the jump rate (AzimKhani et al., 2019).

The protocol of mental exercises was implemented as follows. In order to implement psychological exercises, 14 training sessions of 20 minutes each week, 3 training sessions during physical exercises were considered. In addition to the physical exercises, the physical and mental training group performed the psychological training protocol as per **Table 1**.

Table 1.
Exercise protocol of psychological exercises of the physical -mental exercise group

Session	Purpose
First	Getting to know relaxation methods, practicing breathing routines for relaxation and self-talk and its benefits in controlling stress and improving sports performance
Second	Familiarization with visualization, special cognitive visualization exercise for practicing karate skills. A special motivational imagery exercise - goals for hitting a winning shot in a fight, visualizing a crowd cheering you on after a good shot
Third	Practicing breathing routines and gradual relaxation for relaxation, stress control, fear control, relaxation, invigoration, concentration and recovery. Implementation of external visualization exercise. Ask the athlete to imagine themselves watching a race. Next, ask him to visualize himself fighting from the outside
Fourth	General motivational imagery to increase motivation, self-confidence and control anxiety (such as cognitive toughness after losing a shot, maintaining focus during a match, releasing tension after a bad shot, worrying about the next shot) From the fight. General cognitive imaging to depict competition strategies (such as how to defend one person against another, to be in a good position to strike).
Fifth	Getting to know positive self-talk. In order to increase motivation, control anxiety, increase self-confidence, increase commitment, control stress, control fear, invigorate, focus and restore focus (such as using sentences such as "I am strong, I am grateful, I am determined and confident, I believe in my abilities, I am calm, I will hit well, today my performance will be the best regardless of the match situation, I am interested in the match and I have the necessary energy for this
Sixth	External mental imagery practice along with the practice of replacing thoughts, sentences and behavior. Ask people to replace negative sentences with positive ones. In the mental exercise, ask them to change and replace an unsuccessful move or shot into a successful one
Seventh	Review of techniques from session 1 to 6
Eighth	Internal and external visualization, special cognitive visualization exercise for practicing karate punching skills. Special Motivational Visualization Exercise - Aim to hit a game winning shot, visualize your recent match where you score points and the coach and crowd cheer you on
Ninth	Positive self-talk. In order to increase motivation, control anxiety, increase self-confidence, increase commitment, control stress, control fear, invigorate, focus and restore focus (such as using sentences such as "I am strong, I am grateful, I am determined and confident, I believe in my abilities, I am calm, I will hit well, today my performance will be better regardless of the match, I am interested in the match and I have the necessary energy for it."

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Tenth	General motivational imagery to increase motivation, self-confidence and anxiety control (such as psychological toughness after losing a shot, maintaining focus during the game, releasing tension after an inappropriate shot, worrying about the next game) a fight. General cognitive visualization for visualizing game strategies (such as how to defend one against another, getting in a good position to hit).
Eleventh	Motivational self-talk. In order to increase motivation, control anxiety, increase self-confidence, increase commitment, control stress, control fear, invigorate, focus, and restore focus (such as using sentences like "I am strong, I am confident, I am confident, and good luck"). I believe in my abilities, I am calm, I will hit well, today my performance will be the best regardless of the ground, I am interested in the competition and I have the necessary energy for this."
Twelfth	External and internal mental imagery practice along with the practice of replacing thoughts, sentences and behavior. Ask people to replace negative sentences with positive ones. In the mental exercise, ask them to change and replace an unsuccessful move or shot into a successful one
Thirteenth	Review of combined relaxation and self-talk exercises
Fourteenth	Review of the combined exercises of self-talk, relaxation and mental imagery

2.4. Data analysis

To analyze the data, measures of central tendency & dispersion were used to describe the data. Inferential statistics were used to test the hypotheses of the research. The Shapiro-wilk test was used to ensure the normal distribution of the data and the equality of variances. Data meets important assumptions for ancova, the analysis of covariance (ANCOA) method was used at a significance level of $P<0.05$. Data analysis was done using SPSS 19.

3. Results

The results of the Shapiro-wilk test showed that the data distribution is normal. Well as Levin's statistic for the variables of the research determined that of variances is maintained ($P>0.05$). Also, in order to perform covariance analysis, the assumption of homogeneity slope of the regression line between the covariance and the dependent variable was observed ($P>0.05$). **Table 2** shows that there is a significant difference between the two PME and control groups in the metacognitive beliefs and its components, and sport performance index in the post-test after removing the effect of the pre-test ($P = 0.001$).

Table 2.
Results of covariance analysis - index of metacognitive beliefs (and its components) by controlling the effect of the pre-test

Index - variable	Groups	Pre-test	Post-test	F	P	Effect size	power
		Mean	Mean				
Metacognitive beliefs (general)	PME	68.52	80.93	12.208	0.001	0.59	0.825
	Control	67.30	68.90				
The component of positive beliefs about worry	PME	13.46	17.09	9.125	0.001	0.48	0.782
	Control	13.10	13.51				
The component of negative beliefs about uncontrollability	PME	16.24	13.68	8.058	0.001	0.51	0.789
	Control	15.68	16.35				
The component of cognitive trust	PME	12.63	16.34	10.215	0.001	0.62	0.810
	Control	12.45	12.58				
The component of beliefs about the need to control thoughts	PME	13.90	17.74	12.628	0.001	0.54	0.842
	Control	13.67	13.84				
The component of cognitive self-awareness	PME	12.29	16.08	9.064	0.001	0.61	0.873
	Control	12.40	12.69				
sports performance	PME	16.12	18.46	10.645	0.001	0.64	0.850
	Control	16.39	16.71				

Note: PME= Physical-mental exercise

4. Discussion and conclusion

Researchers are always looking for the best training methods to improve the performance of athletes. Researchers believe that, perhaps, metacognitive beliefs can be effective in achieving sports victory for athletes; but the size of the effectiveness of success in sports can differ based on the ability level of people. The purpose of this research was the effect of mental and physical training during the training period on the metacognitive beliefs and sports performance of elite karate athletes. The findings showed that PME has a significant effect on the metacognitive beliefs and sports performance of elite karate athletes and has improved the cognitive beliefs and sports performance of elite karate athletes.

The current findings in the section on the effect of physical and psychological exercise on metacognitive beliefs with the results of research by Laya et al. (2021), Ferdowsi et al. (2019), Abdullahian et al. It was consistent. In explaining the results of this study regarding the effectiveness of physical and psychological exercises and interventions on metacognitive beliefs, several of the therapeutic bases of these methods can be cited. On the one hand, it can be said; Humans have a kind of self-control system and self-regulating force that they have control over the direction of their thoughts, feelings and behaviors through this self-regulating system and play a decisive role in guiding them. Therefore, we can emphasize the role of cognitive processes in guiding behavior. In psychological intervention programs, mindfulness meditation is

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combined with aspects of cognitive therapy for anxiety and depression to prevent the concentration of negative thoughts because they are not real and efficient thoughts. Psychotherapy techniques based on the presence of mind help people to change from the state of mind where they are always evaluating and judging their performance to the state of being mindful. The purpose of applying exercises based on the presence of mind is to challenge the rational and intelligent problem solving method and also to challenge the perfectionistic expectations that many people use to overcome their anxieties. This approach emphasizes hope in which the emphasis is on being rather than doing, a pathway that supports awareness of both positive and negative experiences. When people become aware of their thoughts and feelings, they let go of their goals of avoiding those thoughts and feelings and instead focus on themselves. Learning how to let go of thoughts, feelings and physical sensations related to depression and anxiety is an important step in developing presence of mind. It can also be said that athletes' training and sports competitions usually emphasize the negative aspects of competition and possible failures. According to this pattern, instead of focusing on the competition, people with competitive anxiety focus their emotional states on the negative aspects of the competition. This means that as soon as the symptoms of anxiety appear, these people pay too much attention to their physical symptoms, worrying thoughts, and negative predictions regarding their inability to control the situation; So that it becomes almost impossible to focus on the task itself. In this regard, athletes with high competition anxiety have a weaker and less desire to do homework than other people. Individuals with high evaluation anxiety tend to react to evaluation cues through irrational overlearning and inhibitory cognitions. Inhibitory cognitions are used as cues for heightened emotional responses. On the other hand, people with low anxiety tend to react to performance evaluation by focusing on cognitive tasks. Two types of metacognitive beliefs play a decisive role in the formation and maintenance of this cognitive pattern that shows the ruminations of the affected person: 1. Positive beliefs about the need to engage with disturbing thoughts. For example: If I worry about my symptoms, I won't ignore important things; and 2. Negative beliefs about the uncontrollability, dangerousness, or importance of thoughts and feelings. For example: Anxiety can drive me crazy. From this point of view, psychological exercises and interventions lead to changing people's beliefs about worry due to "focusing on the here and now and also" non-judgmental attention. In general terms, it can be said that psychological interventions by encouraging people to practice frequently and focus attention on neutral stimuli on the one hand and deliberate awareness of their own body and mind on the other hand, prevent them from being mentally preoccupied with thoughts of threats and worrying about performance. About the competition or the stressor, it leaves their mind out of the automatic, unsupervised and anxious state; In other words, by increasing people's awareness of the experiences of the present moment and returning attention to the cognitive system and more efficient processing of information, it reduces anxiety and physiological tension in them (Beirami et al., 2009).

The current findings in the section on the effect of physical and psychological interventions on sports performance with the results of research by Shah Hosseini et al. (2020), Nikoo Goftar (2019), Sadeghi (2019), Ghorbanejad et al. is aligned So that Shah Hosseini et al. (2019), in their research entitled the effectiveness of the mindfulness model based on sports performance enhancement (MSPE) on the attention to planning and sports performance of elite judokas, concluded that; Mindfulness training based on improving sports performance has significantly improved sustained attention, selective and planned attention. Also, the results about the sports performance scale also showed; Athletes showed a growing trend during the intervention and follow-up period. Also, in the study of E. Johns (2021), he examined the effect of psychological interventions on the performance of marathon runners. His results showed that by controlling for age and running experience, the intervention significantly reduced the level of perceived stress and the occurrence of negative thoughts before the race. Reduces during and after the race. Also, the training of cognitive control skills and relaxation, as a part of psychological skills training, can determine the performance quality of marathon runners.

In explaining the reasons for the effectiveness of physical and psychological interventions on sports performance, we can mention some things, including Bloom's (1968) mastery learning point of view, which points to the effectiveness of the training process in creating learning and ultimately achieving desired performance. Bloom's mastery learning is close to the concepts of competence and skill; As a result, adequacy as a mental element, in addition to mastery, also includes gaining self-confidence or a sense of coping with problems. Self-confidence is the emotional element of competence, and since mastery is a prerequisite for competence, skill, and self-confidence, the positive emotional consequences associated with mastery cause a person to reach proficiency and change to a skilled level through practice, and as a result, his sports performance. To improve probably, by increasing the awareness of training, game, competition situations and creating basic mental schemas, athletes help to regulate their arousal and control their emotions, and by mentally activating the set of responses related to the task, lowering the sensory threshold of performance and mentally warming up the muscles. They pay themselves and thus improve their sports performance. Also, in relation to the influence of mental imagery and mental training on metacognitive beliefs and the performance of athletes, it can be said that relaxation methods based on imagery, by using the conscious adjustment and change of the content of mental images, can reduce negative thoughts that lead to anxiety related to negative performance. Competition and self-confidence decrease (Jeong, 2013). It also makes a person focus on cognitive and motivational skills and strategies, setting goals and controlling his arousal while visualizing. In other words; the use of relaxation based on mental imagery as a kind of coping method leads to reconstructing the experience related to the competition in a mental way (Janek et al., 2006). It can also be stated that; Imagery-based relaxation helps athletes to regulate their thoughts, and the regulation of thoughts is effective in evaluating their performance more positively and increasing self-confidence (Waller, 2009).

In explaining the reasons for the effectiveness of physical and psychological interventions on sports performance and other psychological and physical components related to performance, such as metacognitive beliefs, it can be mentioned that psychological skills give the athlete a sense of progress and allow the athlete to gain confidence during the competition and provide him with information that prepares the body for optimal individual performance (Behzad, 2017). Cooks believes that athletes who have high psychological and physical skills are as successful as possible in their sports competitions and perform their tasks well in team and individual sports (Hamaki, 2013). In recent years, sports psychologists have come to the conclusion that; Athletes need more psychological skills than physical skills to achieve their goals. Recently, American and Canadian psychologists have evolved the implementation of psychological skills and by using psychological skills, they have made significant progress in the performance of professional, Olympic and university athletes (Rahmanian, 2013). There are several theories regarding the practice of mental skills. One of these theories is that psychological skills are only

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problematic in relation to athletes. Of course, this is not an issue because if mental skills are learned, they ultimately have very beneficial effects for all athletes (Venberkel et al., 2009). The second theory is that the psychological skills training program is only for elite athletes, while sports psychologists plan their programs in relation to young people, developing athletes, special people such as mentally retarded, physically disabled, and deaf people. And the third theory is that psychological skills are learned quickly. If coaches and players believe that these skills are learned quickly. While this is not the case and these skills need time and proper practice (Van Peren, 2010). Each of the components of athletes' mental and physical condition is one of the important factors influencing their performance. In the planning stage, when faced with an unfortunate situation, a person plans to reduce the complications caused by the incident. Apparently, both professional and semi-professional athletes are better adapted to this situation and can perform better in adverse situations to fight this situation. Probably, for some reasons, athletes cannot attribute internal factors to their failure and success, and they consider other external factors to be an important factor in this matter. In rumination of a person, with the occurrence of unfortunate circumstances, it creates intellectual preoccupation around various aspects of the event and constantly creates feelings and thoughts. Review due to unfortunate circumstances. To fight this negative component, athletes involve their minds with their sports activities so that they can overcome it. Therefore, it is felt that professional and semi-professional athletes can overcome this component through sports activities. Also; Research shows that exercise and movement activities increase psychological well-being and reduce psychological problems. Physical and physical health leads to the growth of mental health and the increase and growth of cognitive well-being in people. Athletes are sociable and bold people, so that they have a higher threshold of tolerance when dealing with problems and issues than their normal counterparts. Sports and physical activity can lead to the strengthening and growth of psychological well-being as one of the constructs of positive psychology by increasing positive personality aspects and reducing unpleasant behaviors. In addition, athletes use sports and physical activities as an effective coping method to deal with worries and anxieties caused by everyday life, which can help increase psychological well-being as one of the constructs of positive psychology. To do

Finally, in relation to the effectiveness of physical and mental training on sports performance, referring to the research of Coimbra et al. (2021), it can be mentioned that mental training and relaxation based on mental imagery by reducing physical anxiety and sympathetic activity, the amount of secretion It reduces cortisol. Also, muscle relaxation through a regular set of physiological changes reduces oxygen consumption, heart rate, breathing rate and blood lactate, which indicates a reduction in physical anxiety symptoms in a person (English et al., 2019). In this regard, AzimKhani et al. (2019) stated that; Relaxation of the muscles leads to relaxation of the mind; because an emotional state will not exist in the presence of complete relaxation of body parts. In other words, relaxation prevents the generation of negative thoughts and emotions such as anxiety and tension and neutralizes the effects of increased muscle pressure on the body. This method also creates a balance between the posterior and anterior hypothalamus and as a result prevents the occurrence of adverse effects caused by tension and anxiety. Physiological responses become relevant.

It seems that the performance of elite karate athletes is affected by both physical and mental factors. According to the results of this research, it can be acknowledged that; In addition to physical exercises, the technical staff should use psychological exercises in training sessions, taking into account individual differences from other physical and psychological protocols in different training situations according to the needs of the athlete.

Authors' contributions

Conception and design of the study: S.ANA, A. AK; Data collection: S.ANA; Data analysis and/or interpretation: S.ANA, A. AK; Drafting of manuscript and/or critical revision: S.ANA, A. AK; Approval of final version of manuscript: S.ANA, A.AK.

Conflict of interest

The authors declare that there is no conflict of interest.

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