

Investigating the Effectiveness of Mindfulness- Based Intervention on Self-confidence and Levels of Cognitive and Physical Anxiety of Shooters

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Abstract

Introduction: Mindfulness-based intervention (MBI) has been used by many psychologists as a new therapeutic package in many studies. However, this package is less used in sport field. Therefore, the aim of this study was to investigate the effectiveness of six weeks of mindfulness-based intervention on self-confidence and levels of cognitive and physical anxiety of shooters.

Methods: In this semi-experimental research, 17 male professional shooters aging 17- 22 years old from Yazd province who had a history of shooting for at least two years were randomly assigned to two groups, including (1) mindfulness strategies training and (2) control. The training of mindfulness strategies training group comprised 6 sessions (one session per week) and daily homework practice. The instrument used was a CSAI-2 questionnaire. In pre-test, both groups completed the questionnaire 20 minutes before an official match. Then the mindfulness strategies training according to a formerly prepared protocol was held for the intervention group. After intervention, the questionnaire was again completed 20 minutes before the official match with the same conditions by both groups in the post-test. Data were analyzed using independent and paired samples t-test and SPSS-20 software.

Results: The results of this study showed that mindfulness strategies training increased self-confidence ($P=0.002$) and decreased cognitive anxiety ($P=0.04$). However, it did not significantly changed the physical anxiety ($P=0.8$).

Conclusion: It appears that that mindfulness training can be used as a new promising method to increase self-confidence and reduce cognitive anxiety in shooters.

Keywords: Mindfulness-based Intervention, Self-confidence, Anxiety, Shooters

Introduction

Struggling to deliver performance in competitions is one of the main reasons why athletes seek the advice of sports psychologists (1). In recent years, many sports psychologists have shown that psychological skills are the most important variables affecting professional athletes' success. Undoubtedly, athletes at each sports and level may face a lot of pressure ~~that~~ caused by competition and performance. The negative impact of stress and anxiety on sport performance has been shown in many studies (2). Anxiety can be

defined as an increased amount of arousal and independent of the nervous system, that usually approaches the activity of the sympathetic branch, which is associated with the perception of negative mental and motor effects and biochemical, cognitive, behavioral, and psychological changes (3, 4). A state anxiety involves two cognitive and physical components that affect performance. According to Martens *et al.* cognitive anxiety is a subjective part of anxiety and is generated by negative evaluation of performance, while physical anxiety is the physiological and

emotional element of anxiety experience and is associated with the arousal of the autonomic nervous system. Sport self-confidence is also one of the variables related to the competitive anxiety of athletes and is defined as the belief or degree of assurance of individuals about their ability to succeed in sport activities and strengthens the physical skills need to perform athletic activity. In recent years, several studies have been done to improve the performance and self-confidence of athletes in competitions and achieve their effective sport skills to reduce competitive anxiety. Researchers and sports psychologists are seeking to find suitable ways to promote sport performance, self-confidence and reduce competitive anxiety (5). Sport psychology in an attempt to increase the competitive performance of athletes has used cognitive-behavioral methods and techniques that focus on the development of self-control of internal states, mainly referred to as psychological skills training (PST) (6). The PST approach is based on the assumption that negative internal states impede performance and that they must be controlled or reduced thereby promoting an increase in positive thinking and self-confidence. However, in recent years, the literature emerged from among the collections of psychology sub-disciplines has questioned this assumption that negative experiences always lead to negative behavioral consequences. Some scientific studies suggest that focus on controlling or eliminating maladaptive thoughts and emotions, however, may not be as beneficial as previously assumed, since it could paradoxically trigger a monitoring process that searches for negative or unwanted cognitions, bringing them to awareness (7). Thus, over the last few decades, we have seen an increasing use of new interventions called mindfulness that train mindfulness skills to promote mental health and overall health (8). Mindfulness means the attention in a particular way, being in the present moment, purposeful and non-judgment and a way to communicate with all

experiences, including positive, negative, and neutral experiences (9-11). The mindfulness goal is to enhance the ability to be alert and have stable observation of changes in the internal and external stimuli (10, 12). These techniques teach people how to identify unwanted habitual patterns and rumination of the mind and transform them into conscious and voluntary patterns so that negative thoughts and feelings are considered as simple and transient events in the mind (13). This approach clearly differs from the practice of traditional psychological skills both in terms of theoretical assumptions and interventional strategies that has dominated applied sport psychology. The effects of mindfulness training have been shown on many variables as attention and focus, flow, tension, confusion and physiological factors in many studies (12, 14). Scott-Hamilton *et al.* (2016) investigated the role of mindfulness training on flow experiences, pessimism, mindfulness and anxiety of professional cyclists. The results showed positive effects of mindfulness training on the flow, pessimism and mindfulness variables (15). Rothlin *et al.* (2016) in a recent study have shown that mindfulness-based intervention has a positive effect on athletic anxiety and cognitive interference among elite athletes (1). Also, Muangnapoe *et al.* (2016) showed the effectiveness of mindfulness meditation on the physical and cognitive anxiety of elite weightlifters (16). However, most studies have shown anxiety reduction and stress symptoms following mindfulness program (17). Although the positive effects of mindfulness training have been shown to reduce anxiety and increase self-confidence in educational and medical fields (18-20), it has been less studied in sport. Although research on the use of mindfulness interventions has shown significant growth in recent years, such interventions are still at the beginning of the road. In addition, considering that in our country little research has been done regarding the effectiveness of mindfulness intervention

on self-confidence and levels of anxiety of athletes, more research is needed in this regard. In this regard, this study attempts to investigate the effectiveness of mindfulness intervention on self-confidence and anxiety of shooters.

Methods

The research method was semi-experimental with pre-test and post-test design and control group. The statistical population of the study included all male shooters (gun and pistol) in Yazd province that after obtaining a formal license from Department of Sports and Youth in Yazd province volunteered to participate in the research. To select the research samples, a consent form to participate in the research, as well as the form of psychological and physical health and activity history were obtained. The inclusion criteria required athletes to have at least two years of regular activity in shooting and experience in provincial and national competitions, as well as physical and psychological full health. The exclusion criteria included lack of regular participation in training sessions and homework assignments. Also, according to the information obtained from the instructor and athletes, none of the subjects had history of attending psychological classes and it was their first experience. After selecting the qualified individuals according to the information obtained from the questionnaire and after the explanation of the purpose of the study for subjects, the written consent and commitment forms of the participating in the class and test were collected. Seventeen subjects were randomly divided into two groups of (1) mindfulness intervention group (n=8) and (2) control group (n=9). The research instrument was state-competitive anxiety inventory- 2 (SCAI-2). This scale is made by Martens *et al.* (1990) (21) and has 27 items with 3 subscales of self-confidence, cognitive state anxiety and physical state anxiety. The questionnaire answers to questions ranged from "very little (1) to very

high (4)". The final scores varied from 27 to 108. Cronbach's alpha in this questionnaire for the subscale of cognitive anxiety and self-confidence was reported 0.88 and for physical anxiety was reported 0.85 (5, 21). The program of mindfulness intervention was prepared and implemented with the help of a clinical psychologist similar to Kaufman *et al.* (2009) Protocol (22). The mindfulness intervention program included candy exercises, sitting meditation practice focusing on breathing, body scan meditation, mindful yoga practice, walking meditation and sport-specific meditation and daily homework practice in six weeks. Subjects in the test groups participated in six sessions of training (one session of 75 to 90 minutes per week). To measure the variables in the research, the subjects completed the CSAI-2 questionnaire about 20 minutes before the first official match (pre-test phase) (2). Then the mindfulness strategies training was conducted according to the protocol and was carried out under the supervision of an expert clinical psychologist for the experimental group. The subjects of the two groups again filled out the questionnaire in the similar conditions (conditions of the hall, starting time of the competition, etc.) before the second official match (post-test phase). Descriptive statistics were used for data categorization, mean and standard deviation, and inferential statistics for data analysis. The Shapiro-Wilk test was used to determine the normality of the data and independent-samples t-test was used to compare self-confidence, cognitive and physical anxiety in the control and experimental groups, also paired-samples t-test was used to compare pre-test and post-test means. In all tests, the significance level was considered to be 0.05. Data were analyzed by software SPSS 20.

Results

The demographic characteristics of the two experimental and control groups are presented in Table 1. First, to evaluate the normal

distribution of data Shapiro-Wilk test was used. The results of this test showed that the distribution of data in the studied groups was normal. Also, comparison of pre-test scores did not show any significant difference between the two groups, which indicates that the groups were homogeneous (Cognitive anxiety (P=0.59), self- confidence (P=0.39) and physical anxiety (P=0.71)). To evaluate the effect of the interventional period, CSAI-2 questionnaire data compared the mean scores in pre-test and post-test in two groups using the paired-samples t-test. Also, independent-

samples t-test was used to compare two groups. The results showed a significant difference between two groups in cognitive anxiety (P=0.04) and self- confidence (P=0.002) variables. However, there was no significant difference in the physical anxiety variable between two groups (P=0.8). The results are presented in Table 2. Figures 1 to 3 show the variations of different variables of cognitive and physical anxiety and confidence in two stages of pre-test and post-test in the control and experimental groups.

Table 1. Mean and standard deviation related to the subjects' personal characteristics

Group Variable	Mindfulness group (N=8)	Control group (N=9)
Age (year)	18.87 ± 1.45	19.62 ± 2.06
Height (cm)	176.88 ± 4.39	174.38 ± 5.9
Weight (kg)	64.63 ± 4.65	61.88 ± 5.59

Table 2. The results of paired-samples t-test and independent-samples t-test to compare cognitive and physical anxiety and self-confidence between the pre-test and post-test in two groups.

Variable	Group	Time	Mean	Std. Deviation	Paired-Samples t test	Independent-Samples t-test
Cognitive anxiety	control	Pre- test	25.00	3.00	t= 2.182	
		Post- test	23.33	3.00	p= 0.061	t= 2.20
	experimental	Pre- test	24.12	3.56	t= 7.05	p= 0.04*
		Post- test	20.12	2.90	p= 0.00	
Physical anxiety	control	Pre- test	23.11	4.20	t= 0.485	
		Post- test	22.78	4.00	p= 0.641	t= -.25
	experimental	Pre- test	23.87	4.32	t= 1.35	p= 0.8
		Post- test	23.25	3.45	p= 0.21	
Self-confidence	control	Pre- test	22.11	3.00	t= -1.00	
		Post- test	22.55	2.13	p= 0.347	t= -3.86
	experimental	Pre- test	23.37	2.87	t= 3.40	p= 0.002*
		Post- test	26.50	2.00	p= 0.01	

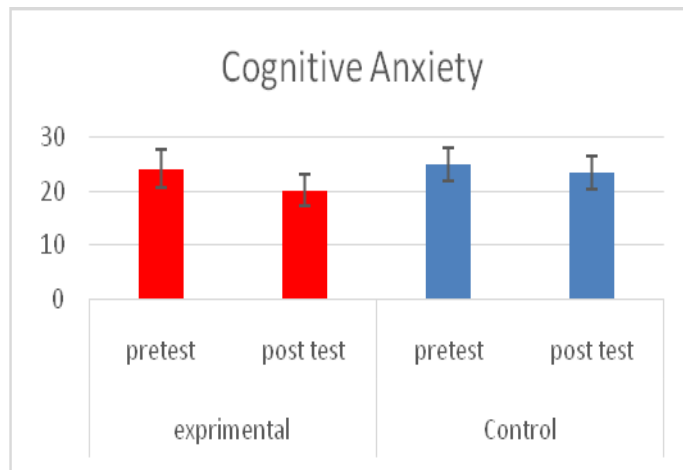


Figure 1. Pre-test and post-test variations of cognitive anxiety variable in the two groups

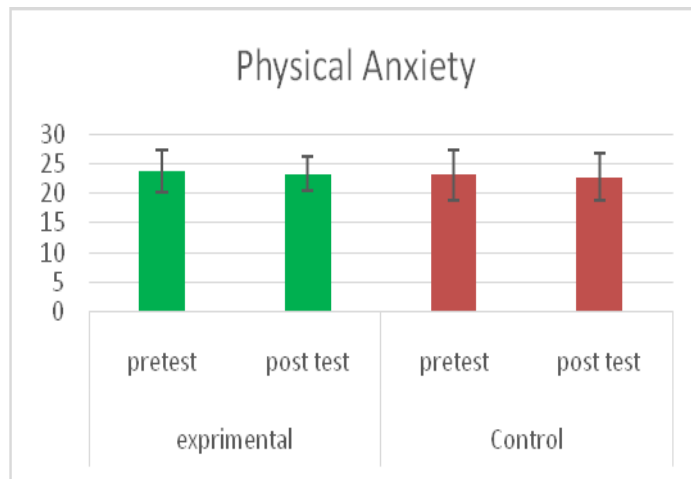


Figure 2. Pre-test and post-test variations of physical anxiety variable in the two groups

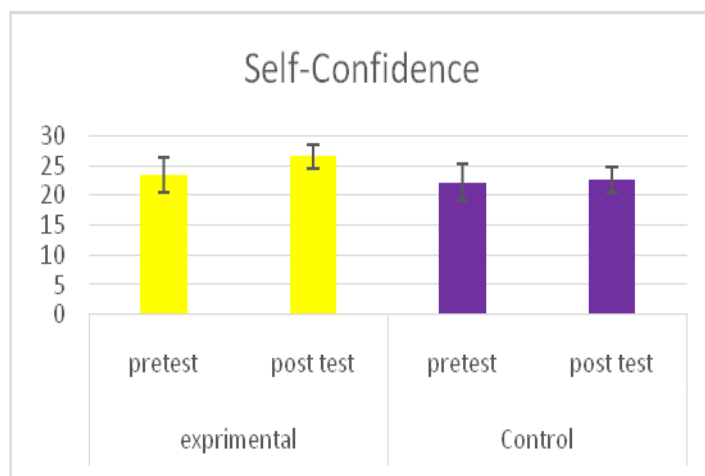


Figure 3. Pre-test and post-test variations of self- confidence variable in the two groups

Discussion

This study was conducted to investigate the effectiveness of mindfulness-based intervention on self-confidence and the levels of cognitive and physical anxiety of shooters. Analysis of data using independent sample t-test showed that there is a significant difference between the two groups in cognitive anxiety and self-confidence variables. However, there was no significant difference between the two groups in the physical anxiety variable. In the applied sport psychology field, evidence suggests that intervention based on mindfulness technique focuses on the development of non-judging, non-evaluative attention to present realities, including both external stimuli and internal processes. Stimuli that enter the awareness are noticed, but are not evaluated as good, bad, right, or wrong. Rather, mindfulness meditation can be thought of as an attentional skill, which can be developed through regular practice, as a form of self-regulated, present-moment attention (16). Mindfulness-based treatments have high efficacy for the treatment of mental disorders and physical illness because they do not make any distinction between the mind and pay attention to both cognitive and physical aspects. Shapiro *et al.* (1998) state that mindfulness may be effective in helping to improve the relaxation response and attentional self-regulation and also can act as a strong behavioral coping tool that encourages participants that "Stress is viewed as a challenge, not a threat" (23). Kabat-Zinn *et al.* (1985) also suggest that mindfulness is effective because that improve the physiological relaxation and cognitive-behavioral changes that are commonly used (12). Of course, it is necessary to emphasize that unlike relaxation exercises in teaching cognitive-behavioral strategies designed to modify physiological arousal, the mindfulness increases the acceptance and non-judging awareness of internal states. However, although relaxation is not the main objective of mindfulness, the relaxation experience is a

relatively common outcome of mindfulness exercises (22, 12). Williams *et al.* (2001) also suggested that mindfulness could be an effective treatment for both physiological and cognitive aspects of stress, and educates new thinking styles about stress situations and management (24). Awareness of the present moment and acceptance increases the focus on the ongoing task and ignores the events of the past and, as a result, drowns the athlete in task and allows him to effectively respond to performance situations. On the other hand, mindfulness exercises lead to more specific goals, more control feel, increased focus and unconscious, and increased self-efficacy. Some evidence suggests that mindfulness exercises may reduce negative emotions by labeling negative emotional stimuli. In this research, it is likely that the acceptance of negative experiences and low attention to anxiety symptoms may help to reduce anxiety before the competition. The results of mindfulness group showed a significant difference in the level of cognitive anxiety and self-confidence following the program in the post-test phase. The results (cognitive anxiety) are consistent with the findings of Rothlin *et al.* (2016), Scott-hamilton *et al.* (2016) and Muangnapoe (2016). Although some studies have found anxiety reduction following mindfulness interventions, some have also not seen any significant reductions in this program. Some researchers believe that the differences between research may be due to the nature of the intervention and the type of program used, the location and duration of the program, and so on (12, 25). In this study, there was no significant difference in physical anxiety subscale. Vesali Mahmoud *et al.* (2017) suggest that for some disorders with physiological causes, there should be a long intervention period. Perhaps the least time for intervention in this research is one of these reasons. Therefore, the reduction of physiological causes may require longer intervention periods (10). In addition, Carmody and Baer (2008) found that the time

spent on homework was significantly related to the degree of change in psychological aspects, and those who are more motivated in exercises would probably be more successful (26). Research results showed the effectiveness of mindfulness exercises on self-confidence. As mentioned, researchers have shown that psychological skills training have a major impact on changing the negative interpretations of anxiety and athletic performance. In justifying this finding, it can be said that psychological strategies that reduce competitive anxiety have the ability to promote positive thoughts in competition and since competitive anxiety with self-confidence plays a negative relationship (5), reduction of anxiety and negative thoughts increase self-confidence. An important point in this intervention program was the use of daily homework practice that probably influenced the effectiveness of the program, while most previous studies lacked homework practice. In general, the presence of psychological abnormalities in some areas, especially athletic performance, has led coaches and physical education specialists to work more closely with their players in order to accurately plan for their athletes in different sports. Therefore, doing research to find the best way to achieve the ultimate goal of an athlete which is the increasing athletic performance is essential.

Conclusion

The results of this study showed that the program of mindfulness training has a positive effect on self-confidence and cognitive anxiety of athletes. Regarding the impact of self-confidence and anxiety on performance, it is recommended that athletes and coaches use mindfulness interventions to reduce cognitive anxiety and increase self-confidence. Considering that the present study is one of the first studies on the effect of mindfulness training on self-confidence and levels of anxiety in the country, future research requires researchers to design effective anxiety-related

interventions and consider their effectiveness in other sport factors.

Ethical issues

Not applicable.

Authors' contributions

Only one author contributed to the writing and revision of this paper.

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