

Applying mindfulness training to enhance the mental toughness and emotional intelligence of amateur basketball players

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Abstract

Objectives: Mindfulness is a proven treatment in clinical settings. Our objective was to examine the feasibility and effect of a mindfulness-training program on the mental resilience and emotional intelligence of amateur basketball players.

Methods: This was a parallel-group, pre- and post- test, randomised controlled trial. Thirty male amateur male basketball players from Tehran, Iran, were assigned randomly into experimental and control groups ($n=15$ each). Outcomes were measured using the mindfulness sport inventory, mental toughness (MT) questionnaire and emotional intelligence questionnaire. Data were analysed using ANCOVA and MANCOVA.

Results: Mindfulness scores were significantly greater in the intervention group than in the controls following training. The intervention also increased overall MT and all of the component sub scores. The same applied to emotional intelligence and all of its components.

Conclusions: These findings may have implications on sport mindfulness training in increasing the MT and emotional intelligence of athletes.

Keywords: mindfulness, mental toughness, emotional intelligence.

There is growing evidence for the value of psychological skills in sporting performance. One approach is mindfulness – an awareness that emerges by intentionally paying attention to the present experience in a non-judgmental or evaluative way.¹

Mindfulness Sport Performance Enhancement (MSPE) was designed for a range of sports, including archery, golf and running.² Initially a 4-week programme, it has been expanded to 6 weeks of weekly 90-min group sessions and daily home practice.² The aim is to help athletes apply mindfulness to both their sport and their lives in general.

A study of golfers and archers reported significant increases in state and trait mindfulness in the former,

overall trait mindfulness in the latter, and state flow for the whole sample.² Flow is a psychological state of full immersion in an activity with energised focus and delight in its performance.³ Both groups reported a posi-

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tive impact on their performance, with similar outcomes in runners.² At 1-year follow-up, the archers, golfers, and runners all reported continued benefits from MSPE including performance, which were related to increases in mindfulness.⁴ However, without a control group, it is impossible to say if these changes were due to MSPE rather than an additional year of experience in the sport.

Other contributors to sporting performance include emotional intelligence and mental toughness (MT) – a psychological construct related to positive stress management. MT is multi-dimensional, including cognitive, affective and behavioural components.⁵

Mindfulness, MT and emotional intelligence are inter-related. For instance, mindfulness could be a mechanism through which MT influences the perception of pain, while being mindful is part of being mentally tough.⁵ Higher levels of mindfulness are also associated with greater emotional intelligence, positive affect and life satisfaction.⁶ In turn, emotional intelligence influences the relationship between mindfulness and quality of life through understanding one's emotions or those of others.⁷ Regular mindful meditation also improves the ability of individuals to regulate and control their emotions, as well as to recover from distress.

The few studies of psychological interventions to enhance MT and emotional intelligence among athletes have focused on cognitive-behavioural interventions.⁸ While these have generally demonstrated improvements in MT, they are not superior to general mental skills development. We therefore investigated if a mindfulness intervention would increase mindfulness and whether, in turn, this was associated with increases in emotional intelligence and MT.

Materials and Methods

This was a parallel-group, pre- and post-test, randomised controlled trial. The sampling frame consisted of all male amateur basketball players in Tehran's 11th district in 2016. We selected a convenience sample of 30 players. Inclusion criteria were players aged between 22 and 24 years old who trained for at least 2 days per week.

Instruments

Mindful Sport Performance Questionnaire. We used the Mindful Sport Performance Questionnaire to measure mindfulness. This 15-item instrument includes three subscales of awareness, non-judgmental thought and re-focusing.⁹ Cronbach's alpha coefficient of the Iranian version was more than 0.70.¹⁰ Content Validity Ratio was 0.86 and Content Validity Index was 0.96.¹⁰

Mental Toughness Questionnaire

The 48-item MT questionnaire was used to measure MT.¹¹ This is the only validated questionnaire that con-

siders MT in both sports and daily life with four subscales of challenge, commitment, control (emotional control and control of life) and confidence (interpersonal confidence and trust in abilities). Responses to each question are evaluated on a 5-point Likert scale. The total internal consistency validity of the Persian version is 0.93.¹²

Self-Rated Emotional Intelligence Scale

The self-rated emotional intelligence scale (SEIS) consists of 33 items and six factors of willingness to participate in sports activities and has been validated in Iran.^{13,14} Structural validity of the Iranian version was more than 0.9 on confirmatory factor analysis.¹⁴ The Cronbach's alpha for the six constituent factors was between 0.73 and 0.79, indicating appropriateness in Iranian athletes.¹⁴

The Intervention: Mindful Sport Performance Enhancement

We used the expanded version of the Mindful Sport Performance Enhancement (MSPE): a 6-week program consisting of weekly 90-min group sessions and home practice.² Participants progressed from sedentary to active mindfulness with sports-specific meditation as the goal.

Procedure

The Allameh Tabataba'i University in Tehran gave ethical approval for the study. All players who agreed to take part in the study signed an informed consent form ($n=30$). Players' names were drawn randomly by an independent party unconnected to the research project until there were 15 players in the experimental group and 15 controls. The participants in the mindfulness condition met once weekly for six sessions (Table 1). They were monitored for adverse effects at every session. Between sessions, athletes were encouraged to listen to e-mailed mindfulness exercises at least 3 days a week. The second author conducted the sessions under the supervision of the first author, who is a psychologist trained in mindfulness. The control group was offered nothing in addition to their usual coaching.

Data Analysis

Data were initially analysed using descriptive statistics. We then used one-way univariate analysis of variance (ANCOVA) to adjust for baseline mindfulness when comparing the effect of the Mindfulness Intervention with controls in terms of both MT and emotional intelligence. We also performed one-way multivariate intergroup analyses of covariance (MANCOVA) to investigate the independent effects on the sub-scores of both instruments. For MT, this was Challenge, Commitment, and Control and Trust, while for emotional intelligence it

Table 1. Mindful Sport Performance Enhancement (MSPE)**Sessions Intervention**

Sessions	Intervention
1	<ul style="list-style-type: none"> • Introduction including descriptions of mindfulness training and mental factors in sport • Setting homework of six meditation sessions of 10 min each
2	<ul style="list-style-type: none"> • Review of homework and further discussion of applying mindfulness to basketball • Body scan meditation (30 min) and discussion • Sitting meditation with a focus on breathing (10 min) and discussion • Setting homework: <ul style="list-style-type: none"> ○ One body scan for 30 min ○ Five meditation sessions of 10 min
3	<ul style="list-style-type: none"> • Review of homework • Mindful yoga practice (40 min) and discussion • Sitting meditation with a focus on breath, and body (15 min) and discussion • Setting homework: <ul style="list-style-type: none"> ○ One body scan for 30 min ○ Five meditation sessions of 10 min ○ One mindful yoga session of 40 min ○ Four meditation sessions of 15 min each
4	<p>As above plus</p> <ul style="list-style-type: none"> • Brief sitting meditation with a focus on diaphragmatic breathing (3 min) • Further homework <ul style="list-style-type: none"> ○ One body scan for 30 min ○ Five meditation sessions of 10 min ○ Two mindful yoga sessions of 40 min each ○ Three walking meditation sessions of 10 min each
5	<ul style="list-style-type: none"> • Sitting meditation with a focus on breathing, body, and sound (23 min) • Walking meditation (10 min) • Sport-specific meditation (13 min) and discussion • Sitting meditation with a focus on diaphragmatic breathing (3 min) • Homework <ul style="list-style-type: none"> ○ Three sitting meditation sessions of 23 min each ○ One walking meditation session of 10 min
6	<ul style="list-style-type: none"> • As for session 5 plus • Body scan practice (30 min) and review • Discussion of continued use of mindfulness techniques at least six times per week for 30 min per day

Source: Kaufman et al.²

was sub-scores for Sense of others, Self-sense, Self-regulation, Social, Emotional, and Optimism domains. Power calculations were based on our primary outcome of mindfulness and informed by a previous study of Irish athletes that reported an effect size of 1.17.¹⁵ We required 13 subjects in each arm to have an 80% chance of detecting a significant difference of 0.05 (two-tailed).

Results

We approached 52 male players to obtain the required sample (Figure 1). There was no attrition in either the intervention ($n=15$) or control group ($n=15$) after

randomisation. Their mean age was 22 years and they had been playing for an average of 1.5 years.

Table 2 indicates that intervention and control groups were similar at baseline in terms of age, basketball experience and weeks in training, as well as scores of mindfulness, MT and emotional intelligence.

The intervention resulted in greater improvements in post-test scores of mindfulness (Table 3). Emotional intelligence and MT ratings were also significantly greater following MSPE (Table 3). In both cases, this was explained by greater improvements in all component sub-scores (Table 3).

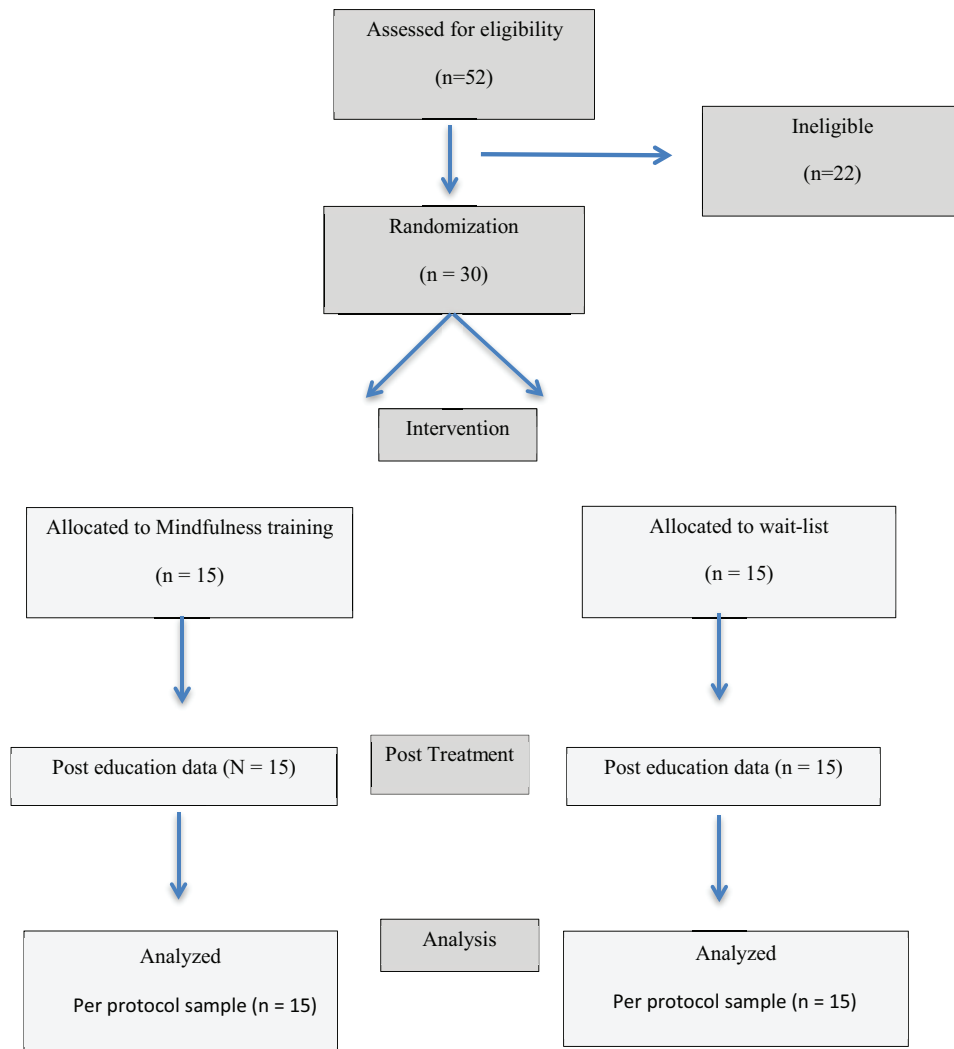


Figure 1. CONSORT Diagram of Participants in Educational Trial.

Table 2. Baseline characteristics of the intervention and control groups

Variable	Group	Mean	SD	t (28)	Sig.
Age	Exp	23.533	1.060	0.345	0.733
	Control	23.400	1.055		
History of playing	Exp	1.533	0.516	0.357	0.724
	Control	1.600	0.507		
Weekly sessions	Exp	2.533	0.743	0.439	0.664
	Control	2.400	0.910		
Mindfulness pre-test	Exp	4.813	0.450	0.81	0.936
	Control	4.827	0.448		
Mental toughness pre-test	Exp	3.501	0.282	0.592	0.559
	Control	3.440	0.286		
Emotional intelligent pre-test	Exp	3.824	0.348	0.249	0.805
	Control	3.792	0.361		

Table 3. Comparing the experimental and control groups in terms of mindfulness, mental toughness and emotional intelligence

Variable	Experimental				Control				ANCOVA	
	Pre-test		Post-test		Pre-test		Post-test		F (1, 29)	P
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Mindfulness Total	4.81	0.45	5.30	0.32	4.83	0.45	4.80	0.43	89.78	0.0005
Mental Toughness Total	3.50	0.28	4.16	0.27	3.47	0.27	3.48	0.28	109.07	0.0005
Challenge	3.41	0.39	4.18	0.37	3.43	0.37	3.45	0.45	58.470	0.0005
Commitment	3.60	0.31	4.25	0.32	3.61	0.31	3.61	0.42	67.618	0.0005
Control	3.22	0.30	3.81	0.28	3.20	0.32	3.20	0.30	51.167	0.0005
Trust	3.48	0.35	4.12	0.30	3.40	0.33	3.45	0.31	83.202	0.0005
Emotional intelligence Total	3.82	0.35	4.42	0.26	3.79	0.36	3.81	0.36	126.56	0.0005
Sense of Others	3.54	0.34	4.28	0.36	3.49	0.44	3.56	0.36	98.868	0.0005
Self-Sense	3.95	0.42	4.39	0.37	3.93	0.41	3.92	0.41	49.607	0.0005
Self-regulation	3.88	0.59	4.44	0.37	3.92	0.56	3.91	0.54	42.643	0.0005
Social	4.03	0.60	4.53	0.43	3.98	0.55	3.97	0.62	16.701	0.0005
Emotional	3.83	0.49	4.43	0.33	3.80	0.48	3.78	0.46	90.818	0.0005
Optimism	3.90	0.60	4.55	0.41	3.80	0.57	3.87	0.57	29.733	0.0005

Discussion

To our knowledge, this is the first study to investigate the effects of MSPE on both mindfulness scores, MT and emotional intelligence in amateur basketball players, as opposed to looking at the three outcomes in isolation. We found that the Mindfulness Training program led to an increase in mindfulness in beginner-grade basketball, as has previously been reported in shooters, golfers and runners.⁴ There was also a significance effect on MT. Possible explanations are that mindfulness reduces pain or enhances learning through self-verbal, emotional and control strategies.⁴ Mindfulness also improves attention through focusing on a neutral stimulus.

As mindfulness increases, so does the general level of MT. This leads to increased confidence in the ability to overcome challenges, adhere to a training regimen and self-regulate competition-related behaviours and emotions.¹⁶ In addition, mindfulness training reduces perceived stress and emotional reactions to threatening situations, while helping athletes understand their feelings without judgment and interference.

Finally, mind-awareness exercises may increase the thickness of grey matter, thereby promoting learning, memory, and emotional regulation.¹⁷ Hence, athletes with higher levels of awareness can easily gain physical skills and have the ability to learn skills throughout the

program. Therefore, it seems that increasing the awareness of the effect of training in the present study has increased attention, concentration and commitment (achievement of the goal), and thus the athlete's MT.

There are several limitations. These include a small sample that was restricted to young adult males, and a lack of follow up data on whether changes in MT or emotional intelligence were maintained. The study may have been affected by attention bias in the intervention group, as the controls were offered nothing. In addition, there were no objective measures of whether the intervention improved athletes' performance. Finally, the nature of the intervention meant that it was impossible to blind the participants or research personnel to allocation status. Strengths of the study include the use of a randomised control design, and standardised evaluation of MT and emotional intelligence before and after mindfulness training.

Our results may have implications for sports in general. Athletes and coaches should understand how both mindfulness and emotional intelligence can affect performance and consider these variables when developing training strategies. Athletes need to be aware of, and manage, their feelings, as well as recognise what is happening within them (such as anxiety). These findings may also have implications for clinical practice given the importance of exercise to mental well-being.

Disclosure

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