

# The effects of deep breathing on the mental toughness of athletes in Puchong Fuerza football club

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## Abstract

### *Background and Study Aim*

A group of psychological traits that are essential to achieving peak performance are referred to collectively as mental toughness. One of the most significant psychological traits linked to sports success, according to athletes, coaches, and sport psychologists, is mental toughness. This study aims to identify the effects of deep breathing on the mental toughness of athletes in Puchong Fuerza Football Club who played in M3 Football League, the Malaysia's third-tier football league.

### *Material and Methods*

The research was conducted experimentally with two sessions which include pre-test and post-test. Mental Toughness Questionnaire 48 (MTQ48) and deep breathing techniques were used in this research. Data findings were analyzed to answer the research questions and null hypothesis. Hypothesis testing was used, and inferential statistics analyzed the data. Paired sample t-test was used to identify the effects of deep breathing techniques on mental toughness scores in pre-test and post-test.

### *Results*

The analysis results showed that data on mental toughness was negative. It proved by the mean score difference of the pre-test and post-test, in which there were increments of mental toughness score after applying deep breathing technique. Meanwhile, there was a significant difference in mean scores between players toward their mental toughness based on pre-test and post-test results.

### *Conclusions*

Therefore, the deep breathing technique has relations with performance and psychological outcomes and can be use as a pre-match mental preparation. It is suggested that coaches and athletes may include the deep breathing technique in training program. The players need to undergo psychological skill training such as deep breathing technique to improve their mental toughness and to ensure that anxiety is at an optimal level in order to achieve excellent performance in competitions.

**Keywords:** mental toughness, deep breathing, football athletes, mental toughness questionnaire

## Introduction

Performance in football is not only based on physical fitness, technique, tactics, endurance, agility, and coordination, but psychological factors such as motivation, psychological skills (PS), and mental toughness have been considered essential for football performance [1, 2, 3]. According to Weinberg et al., athletes with strong appear to prevail more often compared to athletes with weak mental toughness as physical, technical, and tactical skills are as important as mental fitness [4].

In sports, mental toughness is as important as physical fitness for players. Stress and pressure are often experienced by athletes, both amateur and elite sports athletes [5]. Hence, mental or psychological training is very crucial for them [6].

Sports psychologists explained that mental toughness is the ability to consistently perform toward the upper range of your talent and skill regardless of competitive circumstances, as well

as s the most critical psychological attribute in determining success [3, 7, 8, 9]. Mahoney et al. states mental toughness is a term often used to describe a collection of psychological characteristics thought to be central to high performance [10]. Athletes, coaches, and sports psychologists have consistently implicated mental toughness as one of the most important psychological characteristics related to success in sports [7]. Most athletes and coaches believe that psychological factors are equally important as physical and skills attributions to be the winner. Cowden argued that at least 88% of relevant studies found athletes with higher levels of mental toughness tend to achieve more or perform better [11]. With very upper-range skills and psychology, they have excellent skills in controlling their mind to achieve victory. Mental toughness will not compensate for lack of talent, but it can differentiate between winning and losing in close contests. Mentally tough athlete has a high sense of self-belief and an unshakable faith that they can control their destiny. These individuals can remain relatively unaffected by competition

and adversity [12].

Researchers nowadays are tended to focus on defining and describing mental toughness without exploring the relationship between mental toughness and variables such as achievement level, gender, age, sporting experience, or type of sports. The importance of this study was to investigate the effects of deep breathing on mental toughness. The study of Nirmalasari et al. recommended that the combination of the deep breathing exercise with active range of motion decreases the systole in Congestive Heart Failure (CHF) patients [13]. In line with Greiwe et al. study, proper breathing is inextricably interwoven with well-coordinated movement and mental skills in sports [14]. It also served to figure if all the athletes can dominate the deep breathing technique and apply it in any situation, especially in tournament seasons. Through the interventions, athletes can feel stress reduction before or during the tournament. Therefore, the study is crucial to help the coaches apply and develop the psychological skills of athletes, especially in mental toughness through deep breathing, to help the team attain success.

This research focused on investigating the effects of deep breathing on the mental toughness of Puchong Fuerza athletes. This research was carried out in two sessions, i.e., pre and post-sessions. Deep breathing and mental toughness literature review were studied in depth to construct the main research question in this study. This study focused on football athletes who played in Malaysia's third-tier division.

## Materials and Methods

### *Participants.*

The athletes involved in this research are 24 footballers of the M3 football league from Puchong Fuerza Football Club. The criteria include the athlete must actively compete within 1 to 2 years, have a good health condition, and will be able to commit to this research. All procedure performed in this study were in accordance with ethical standard of the institutional Research Ethics Committee. Informed consent was obtained from all participants involved in this study.

### *Research Design.*

This research is a quantitative experimental study. Athletes were requested to take pre-test and post-test to measure the effects of deep breathing on mental toughness. The Mental Toughness Questionnaire-48 (MTQ48) as conducted in previous study was administered to collect scores [13]. The previous study by Dahlan and Muhamad [15] as well as Lamat et al. [16] also used MTQ48 as an instrument. A quantitative approach focused on research, whereas the data analysis process focused on numerical data using statistical counting. The

results from this study were explained in terms of calculation and numbers.

This study used two main research instruments, i.e., the deep breathing technique and MTQ48. There were a lot of suitable ways for athletes to practice the deep breathing technique. They could sit straight up or even lie down while putting the hands-on top of their stomach and chest. In this study, the researcher used 343 breathing methods: inhale in the count of 3, then holding the breath in the count of 4, and exhaling in the last count of 3. The researcher's rationale chooses the minimal count of seconds because this technique could be done anytime without consuming much time. For example, if the athletes feel stressed during the tournament, they can do deep breathing techniques to relieve their stress. Meanwhile, there were 48 questions to be answered using 5 points Likert scale in the Mental Toughness Questionnaire 48-Items (MTQ48). The respondents were required to answer all the questions by circling the correct choices.

### *Statistical Analysis.*

The data were obtained from the questionnaire. The researchers recorded all the data and analyzed them using IBM SPSS Version 23.0. The significant statistic was set at  $p \leq 0.05$ . Paired sample t-test was used to analyze the score differences of mental toughness in pre-test and post-test.

This study aims to identify the effects of deep breathing techniques on the mental toughness of football athletes from the third-tier Malaysia football league club, Puchong Fuerza FC. The data obtained from the pre and post-tests of the questionnaires were analyzed using paired sample t-test inference statistics and were processed using SPSS software version 23.0. The researcher reviewed the sample answers in the pre-test and post-test questionnaires to ensure that the respondents answered according to the instructions. The process of analyzing the data divided into two parts, i.e. Part A and Part B. Part A contained the demographics of the respondents. At the same time, Part B analyzed the scale values of pre-test and post-test questionnaires for the respondent groups by comparing mean and paired sample t-tests in Statistical Package For The Social Sciences (SPSS) version 23.0. Two null hypotheses were presented to answer the two research questions of this study. Paired sample t-tests were used to determine if there were any significant differences in the effects of deep breathing technique between pre-test and post-test mental toughness scores and to determine if there were any mean differences between players towards their mental toughness score.

## Results

*Analysis of the significant difference on the effects of deep breathing technique.*

The paired sample t-test was used to identify the effects of deep breathing techniques on the pre-test and post-test on mental toughness scores. The test determined any significant differences in the effects of deep breathing techniques between pre-test and post-test mental toughness scores. The increment of mean scores could determine how far deep breathing techniques affect the mental toughness scores. Table 1 shows the differences in mean scores for the pre and post-groups.

Table 1 illustrates the paired sample t-test and the differences between the mean score from pre-test and mean score from post-test. Paired sample t-test analysis showed that the p-value was 0.024, which was significant at the level  $p < 0.05$ . Thus, this finding rejects the first null hypothesis which is there are no significant differences between the effects of deep breathing technique between the mental toughness score of pre-test and post-test.

*Analysis means differences between players towards their mental toughness*

The paired sample t-test was also used to identify the different effects on the feeling of players after doing the deep breathing technique using mental toughness score. The test determined any mean differences between players towards their mental toughness score. The increment on these two mean scores indicates how far the deep breathing technique affects the mental toughness score of players. Table 2 shows the paired sample statistics for the mean score for the pre and post-group.

Based on Table 2, the mean score for pre-test was 3.6163, while the mean score for post-test was 3.8017. The data indicate that the mean score value for the post-test was higher than the mean score value for the pre-test. Thus, this finding rejects the second null hypothesis: there were no mean differences between players towards their mental toughness score.

## Discussion

The results of this study including the difference between mental toughness scores in pre-test and post-test after applying deep breathing techniques, is discussed. The analysis results showed that data on mental toughness was negative. It proved by the mean score difference of the pre-test and post-test, in which there were increments of mental toughness score after applying deep breathing technique. The previous study by Perciavalle et al. proved that the use of deep breathing techniques has a significant improvement between the beginning and the end of the training and also lead to an effective improvement of management stress in everyday life [17].

During the testing of the first and second null hypotheses, the paired sample t-test was used. It shows a significant value of deep breathing technique between pre-test and post-test of mental toughness scores (0.024). Meanwhile, there was a significant difference in mean scores between players toward their mental toughness based on pre-test and post-test results. The athletes showed an increasing reaction towards their mental toughness. Based on table 1, the mean score difference between pre-test and post-test was -0.18535. These finding agreed with Cowden who indicated that mental toughness is one of the most crucial psychological factors impacting athletic success [11]. The link between mental toughness and sporting achievement can be observed not just when performance is measured objectively, but also when the athlete evaluates their own performance subjectively [8, 9, 18, 19, 20].

Hence, the hypotheses null was rejected. Paired sample t-test was used to test the null hypothesis to answer null hypotheses 1 and 2. The data analysis showed that both null hypotheses were rejected successfully due to the significant means score difference in the first and second objectives.

**Table 1.** The differences in mean scores for the pre and post-groups.

TEST	Paired Samples Test						t	df	Sig. (2-tailed)
	Paired Differences			95% Confidence Interval of the Difference					
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper				
Pair 1 PRE TEST-POST TEST	-18535	.37530	.07661	-.34382	-.02687	-2.419	23	.024	

**Table 2.** The paired sample statistics for the mean score for the pre and post-group.

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRE-TEST	3.6163	24	.19241	.03928
	POST-TEST	3.8017	24	.33606	.06860

Based on the results, deep breathing was proven to positively impact [21] athletes' mental toughness, especially before or during a tournament [22].

## Conclusions

In conclusion, this deep breathing technique can positively affect athletes' mental and psychological development. Besides performing deep breathing techniques during tournaments, athletes can apply them daily. In addition, deep breathing exercises can improve pulmonary function [23], motor abilities [10]. Having a good mind is as essential as having a healthy body.

The researchers carried out this study to expand more literature about the importance and relation of psychological skills to sports [24], profound breathing, and mental toughness. There are so many benefits to be harnessed in applying this skill or technique. This study can open the athletes' eyes by doing the right thing in managing their emotions and making sure that they are always positive.

### Recommendation for Future Research

A strong mentality is vital, especially for medium

or high-intensity sports. The previous research by Bell et al. also focused on the importance of mental toughness in sports [25]. From the benefits of the study, athletes will know the importance of having mental toughness and can keep it up by just using simple methods such as deep breathing.

For future research, the researchers hope there would be more studies about a psychological technique [26] that could help improve the mental toughness of athletes. The researchers could expand and increase the respondents to get a better validity about this concept of study.

Finally, future researchers also can study athlete perceptions of the effects of deep breathing towards mental toughness, especially for high profile athletes. Clear studies also must be done to spread more knowledge between athletes and non-athletes.

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