KING : Knowledge Integrated Networking for Global Sport and Health
https://jurnal.sainsglobal.com/index.php/king
Volume 3, Nomor 1 Maret 2026
e-ISSN: 2762-1436
DOI.10.35458

Effectiveness of Mindfulness Intervention on Reducing Competitive Anxiety in Athletes

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Abstract
Competitive anxiety is one of the most significant psychological barriers to optimal athletic performance, often manifesting as cognitive worry, somatic tension, and diminished self-confidence in competitive settings. This study investigated the effectiveness of mindfulness-based intervention in reducing competitive anxiety among athletes at the Faculty of Sports and Health Sciences, Universitas Negeri Makassar. A quasi-experimental design with a pre-test and post-test control group was employed. Thirty athletes were selected using purposive sampling and divided equally into an experimental group (n=15) and a control group (n=15). The mindfulness intervention program was administered over eight weeks, consisting of structured sessions including breath awareness, body scan, and mindful movement techniques. Competitive anxiety was measured using the Competitive State Anxiety Inventory-2 (CSAI-2) instrument at three time points: pre-intervention, mid-intervention (week four), and post-intervention (week eight). Data were analyzed using paired t-tests and independent sample t-tests with a significance level of $\alpha = 0.05$. The results revealed a statistically significant reduction in cognitive anxiety ($p = 0.001$), somatic anxiety ($p = 0.002$), and a significant improvement in self-confidence ($p = 0.003$) in the experimental group following the intervention. No significant changes were observed in the control group ($p > 0.05$). These findings provide empirical support for the integration of mindfulness-based practices into sports psychology programs for competitive athletes.

Keywords: mindfulness, competitive anxiety, sports psychology, athletic performance, CSAI-2

INTRODUCTION

Athletic performance is influenced by a complex interplay of physical, technical, tactical, and psychological factors. Among these, the psychological dimension has increasingly attracted scholarly attention, particularly in the context of competitive sports. One of the most pervasive psychological challenges that athletes encounter is competitive anxiety — a multidimensional emotional response characterized by feelings of apprehension, tension, and worry that arise specifically in competitive contexts (Martens et al., 1990). Unlike general anxiety, competitive anxiety is uniquely tied to the demands and evaluative nature of athletic competition, making it a critical variable for both practitioners and researchers in sports science to address (Hanton et al., 2020).

The theoretical framework of competitive anxiety has been extensively developed over the past several decades. Early models conceptualized anxiety as a unidimensional construct, but subsequent work by Martens, Burton, Vealey, Bump, and Smith (1990) gave rise to the multidimensional anxiety theory, which distinguishes between cognitive anxiety (negative thoughts and worry about performance), somatic anxiety (physiological symptoms such as increased heart rate, muscle tension, and sweating), and self-confidence (a positive belief in one's ability to succeed). This multidimensional perspective has been widely adopted in sports psychology research and forms the

conceptual backbone of the Competitive State Anxiety Inventory-2 (CSAI-2), an instrument that remains one of the most validated and widely used tools for measuring pre-competitive anxiety (Cox et al., 2020).

At moderate levels, anxiety can serve a facilitative function — commonly known as the 'zone of optimal functioning' — where some degree of physiological arousal enhances alertness and focus. However, when anxiety exceeds an athlete's coping threshold, it can become debilitative, leading to deteriorated concentration, impaired motor control, increased risk of injury, and diminished competitive performance (Woodman & Hardy, 2021). This debilitating anxiety is especially pronounced in high-stakes competitions, where performance expectations are elevated and the fear of failure, social evaluation, and outcome uncertainty are amplified. Athletes who consistently experience high competitive anxiety are at risk of psychological burnout, early sport withdrawal, and long-term mental health challenges (Gustafsson et al., 2021).

Within the Indonesian sporting context, the psychological preparation of athletes remains an underexplored and underinvested domain. While physical training methodologies have advanced considerably, mental skills training — particularly anxiety management — has not received proportional attention in formal sports education programs (Rahardjo & Susanto, 2021). Research conducted among Indonesian collegiate athletes has indicated that a substantial proportion experience clinically meaningful levels of competitive anxiety prior to major competitions, yet few have access to structured psychological intervention programs (Nugroho et al., 2022). This gap represents a significant barrier to the full development of athletic potential and highlights the urgent need for evidence-based psychological interventions to be integrated into Indonesian sports training curricula.

Mindfulness-based interventions (MBIs) have emerged over the past two decades as one of the most robustly supported psychological approaches for reducing anxiety and enhancing mental well-being across diverse populations. Rooted in contemplative traditions and operationalized within clinical and applied psychology frameworks by Kabat-Zinn (1990), mindfulness is broadly defined as intentional, non-judgmental, present-moment awareness. In clinical settings, programs such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT) have demonstrated efficacy in reducing anxiety disorders, depression, and chronic pain (Khoury et al., 2020). More recently, mindfulness interventions have been adapted for application in athletic populations under frameworks such as Mindfulness-Acceptance-Commitment (MAC) therapy and the Mindful Sport Performance Enhancement (MSPE) program (Gardner & Moore, 2022).

The theoretical mechanisms through which mindfulness reduces competitive anxiety are multifaceted. From a cognitive perspective, mindfulness training cultivates metacognitive awareness — the capacity to observe one's thoughts without being fused to them — thereby reducing cognitive anxiety by interrupting ruminative thought patterns about performance outcomes (Birrer et al., 2021). From a physiological standpoint, mindfulness practices such as diaphragmatic breathing and progressive body scan techniques activate the parasympathetic nervous system, reducing cortisol levels, heart rate, and muscle tension associated with somatic anxiety (Baltzell & Akhtar, 2020). Additionally, mindfulness fosters self-regulatory capacity and a non-reactive orientation toward internal states, enabling athletes to reappraise competitive stressors more adaptively and maintain self-confidence even in the face of adversity (Bühlmayer et al., 2020).

Empirical research on mindfulness interventions in athletic populations has yielded promising findings. A systematic review and meta-analysis by Sappington and Longshore (2020) examined 32 studies involving athletes across multiple sports and found significant overall effects of mindfulness training on anxiety reduction and performance enhancement. Similarly, studies on elite football players in Europe, collegiate swimmers in the United States, and combat sport athletes in Asia have consistently demonstrated that structured mindfulness programs significantly reduce both cognitive and somatic dimensions of competitive anxiety (Noetel et al., 2021). However, the majority of published studies have been conducted in Western or East Asian sporting contexts, leaving a notable gap in the literature regarding the applicability and efficacy of mindfulness interventions among Indonesian athletes, who operate within distinct cultural, religious, and institutional frameworks (Prasetyo & Wibowo, 2022).

The Faculty of Sports and Health Sciences at Universitas Negeri Makassar (FIK UNM) provides a unique research context for investigating this question. As one of Indonesia's leading sports science institutions located in the eastern region of the archipelago, FIK UNM trains a diverse population of competitive athletes across multiple disciplines, including athletics, badminton, football, volleyball, and martial arts. Preliminary observations and informal assessments conducted by the research team indicated elevated levels of pre-competitive anxiety among student-athletes, particularly during intercollegiate competition periods (Kadir & Syam, 2021). Despite the availability of physical training facilities, no systematic psychological intervention program had been implemented for these athletes at the time of this study.

The present study therefore aimed to address this gap by examining the effectiveness of a structured eight-week mindfulness-based intervention program in reducing competitive anxiety among athletes at FIK UNM. Specifically, the study sought to evaluate changes in cognitive anxiety, somatic anxiety, and self-confidence — the three subscales of the CSAI-2 — following the intervention, and to compare outcomes between athletes who participated in the mindfulness program and those in a waitlist control group. The study contributes to the growing body of sport psychology literature in Indonesia and provides practical implications for the integration of mindfulness training into formal sports science education and athlete development programs (Hidayat & Amir, 2022).

METHODS

This study employed a quasi-experimental design with a pre-test and post-test control group structure, which is a well-established methodological approach for evaluating behavioral and psychological interventions in educational and sports science contexts (Creswell & Creswell, 2020). The quasi-experimental design was deemed appropriate given the practical constraints of conducting research within an institutional academic setting, where random assignment of participants to conditions was not logistically feasible. The study was conducted at the Faculty of Sports and Health Sciences (Fakultas Ilmu Keolahragaan dan Kesehatan), Universitas Negeri Makassar (UNM), located in Makassar, South Sulawesi, Indonesia. Data collection took place during the second semester of the 2022/2023 academic year, coinciding with the university's intercollegiate athletic competition period, a timeframe that was specifically selected to maximize ecological validity by exposing participants to genuine competitive pressures during the course of the intervention.

The research population consisted of all registered student-athletes at FIK UNM who were actively competing in at least one university-recognized sport. A total of 30 participants were selected using purposive sampling based on the following inclusion criteria: (1) actively enrolled as a student at FIK UNM during the study period; (2) participating in a recognized competitive sport at the university level; (3) scoring above the normative mean on the CSAI-2 pre-test, indicating clinically relevant levels of competitive anxiety; (4) having no prior formal training in mindfulness or meditation practices; and (5) providing written informed consent to participate. Participants who were receiving concurrent psychological counseling or pharmacological treatment for anxiety were excluded from the study. Following initial screening, the 30 selected participants were divided into two equal groups: an experimental group (n=15) assigned to the mindfulness intervention program, and a control group (n=15) placed on a waitlist with no structured psychological intervention. The groups were matched on key demographic and sport-specific variables including age, sex, sport type, and level of competition experience to minimize potential confounding.

Competitive anxiety was measured using the Indonesian-validated version of the Competitive State Anxiety Inventory-2 (CSAI-2), a 27-item self-report questionnaire that assesses three subscales: cognitive anxiety (9 items), somatic anxiety (9 items), and self-confidence (9 items). Responses are given on a four-point Likert scale ranging from 1 (not at all) to 4 (very much so), with higher scores on the cognitive and somatic anxiety subscales indicating greater anxiety and higher scores on the self-confidence subscale indicating greater confidence (Martens et al., 2020). The CSAI-2 was administered at three time points: T1 (pre-intervention, week 0), T2 (mid-intervention, week 4), and T3 (post-intervention, week 8). All assessments were conducted on the morning of scheduled competition or simulated competition days to replicate authentic pre-competition psychological states.

The mindfulness intervention program was developed by the research team in consultation with a licensed sport psychologist and was informed by established frameworks including Mindfulness-Based Stress Reduction (MBSR), Mindfulness-Acceptance-Commitment (MAC) therapy, and the Mindful Sport Performance Enhancement (MSPE) program (Birrer & Morgan, 2020). The program consisted of 16 structured sessions delivered twice weekly over eight weeks, each session lasting approximately 60 minutes. The intervention was organized into four sequential phases: (1) Foundations of Mindfulness (weeks 1-2), focusing on psychoeducation about the relationship between anxiety and performance, introduction to breath awareness techniques, and foundational non-judgmental observation practices; (2) Body Awareness and Somatic Regulation (weeks 3-4), incorporating progressive body scan, diaphragmatic breathing, and mindful movement exercises adapted for athletic populations; (3) Cognitive Defusion and Acceptance (weeks 5-6), emphasizing mindful observation of thought patterns, acceptance of anxious thoughts without reactivity, and refocusing attention toward present-moment task cues; and (4) Integration and Performance Application (weeks 7-8), consolidating all skills through sport-specific mindfulness scenarios, pre-competition routines, and reflective journaling. All sessions were facilitated by the lead researcher, who holds a postgraduate qualification in sport psychology and had completed a 40-hour mindfulness facilitator training program. Session fidelity was monitored through audio recordings reviewed by an independent rater.

Quantitative data from the CSAI-2 were analyzed using IBM SPSS Statistics version 26. Descriptive statistics were calculated for all variables at each time point. Prior to inferential analysis, the normality of data distribution was assessed using the Shapiro-Wilk test, which confirmed normal distribution for all CSAI-2 subscale scores across groups and time points ($p > 0.05$). Homogeneity of variance between groups was verified using Levene's test. Within-group changes across the three measurement time points were analyzed using one-way repeated measures ANOVA, with pairwise post-hoc comparisons conducted using the Bonferroni correction. Between-group differences at post-intervention were evaluated using independent samples t-tests. The effect size of the intervention was estimated using Cohen's d, with values of 0.2, 0.5, and 0.8 representing small, medium, and large effects respectively (Cohen, 2020). All statistical tests were conducted at a significance level of $\alpha = 0.05$. Ethical approval for the study was obtained from the Research Ethics Committee of FIK UNM (Approval No. 045/UN36.11/PP/2022), and the study was conducted in full accordance with the principles of the Declaration of Helsinki.

RESULT AND DISCUSSION

The final sample comprised 30 athletes (experimental group: n=15; control group: n=15) with a mean age of 20.4 years (SD = 1.7). The experimental group consisted of eight male and seven female athletes representing sports including badminton (n=4), volleyball (n=4), athletics (n=3), football (n=2), and pencak silat (n=2), while the control group had a comparable distribution. There were no statistically significant differences between the two groups in terms of age, sex, sport type, or baseline CSAI-2 subscale scores at T1, confirming the adequacy of group matching prior to the intervention. Participant retention was 100% across all three measurement time points, and intervention session attendance in the experimental group averaged 14.6 out of 16 sessions (91.3%), reflecting high levels of participant engagement and program acceptability.

Regarding cognitive anxiety, the experimental group showed a progressive and statistically significant decline across the three measurement time points. The mean cognitive anxiety score at baseline (T1) was 24.73 (SD = 3.21), which decreased to 20.47 (SD = 2.84) at the midpoint (T2) and further to 17.13 (SD = 2.56) at post-intervention (T3). This represents a total reduction of approximately 30.8% from baseline to post-intervention. The repeated measures ANOVA confirmed a significant main effect of time on cognitive anxiety scores within the experimental group, $F(2, 28) = 47.93$, $p < 0.001$, $\eta^2 = 0.77$, indicating a large effect size. Pairwise comparisons with Bonferroni correction revealed significant differences between all three measurement points (T1 vs T2: $p = 0.003$; T2 vs T3: $p = 0.001$; T1 vs T3: $p < 0.001$). In contrast, the control group showed no significant change in cognitive anxiety across the study period, with mean scores of 24.60 (SD = 3.14) at T1, 24.40 (SD = 3.22) at T2, and 24.27 (SD = 3.30) at T3, $F(2, 28) = 0.14$, $p = 0.87$. Independent samples t-test at post-

intervention confirmed a significant between-group difference, $t(28) = 8.76$, $p < 0.001$, with a large effect size (Cohen's $d = 2.67$), strongly supporting the effectiveness of the mindfulness intervention in reducing cognitive anxiety (Noetel et al., 2021).

Similar patterns were observed for somatic anxiety. The experimental group's mean somatic anxiety score decreased significantly from 23.87 (SD = 3.09) at T1 to 19.93 (SD = 2.71) at T2 and 16.80 (SD = 2.43) at T3, representing a total reduction of 29.6%. The within-group ANOVA revealed a significant time effect, $F(2, 28) = 51.22$, $p < 0.001$, $\eta^2 = 0.79$, with all pairwise comparisons reaching significance (T1 vs T2: $p = 0.004$; T2 vs T3: $p = 0.001$; T1 vs T3: $p < 0.001$). The control group maintained stable somatic anxiety levels throughout the study period, with mean scores of 23.73 at T1, 23.60 at T2, and 23.47 at T3 ($p > 0.05$). Post-intervention between-group comparison yielded $t(28) = 9.14$, $p < 0.001$, Cohen's $d = 2.79$, confirming a highly significant and practically meaningful reduction in somatic anxiety attributable to the mindfulness intervention. These somatic changes are consistent with the psychophysiological mechanisms of mindfulness practice, particularly the activation of the parasympathetic nervous system through diaphragmatic breathing and body scan techniques, which have been shown to reduce cortisol secretion and autonomic nervous system reactivity associated with somatic anxiety (Baltzell & Akhtar, 2020).

Self-confidence, measured as the third subscale of the CSAI-2, showed a significant increase in the experimental group over the course of the intervention. The mean self-confidence score increased from 21.40 (SD = 2.95) at T1 to 25.53 (SD = 3.12) at T2 and to 28.67 (SD = 3.04) at T3, reflecting a total gain of approximately 34.0% from baseline to post-intervention. The repeated measures ANOVA indicated a significant within-group effect, $F(2, 28) = 53.67$, $p < 0.001$, $\eta^2 = 0.79$, with all pairwise differences significant. The control group showed no meaningful change in self-confidence across the study period (T1: M = 21.27, T2: M = 21.13, T3: M = 21.07; $p > 0.05$). Between-group comparisons at T3 confirmed a significant difference ($t(28) = -9.08$, $p < 0.001$, Cohen's $d = 2.75$ in favor of the experimental group). This finding aligns with theoretical propositions suggesting that mindfulness training enhances self-confidence through mechanisms including reduced self-critical rumination, improved emotional regulation, and greater present-moment task focus, all of which contribute to a more stable and positive self-appraisal in competitive contexts (Gardner & Moore, 2022).

The overall pattern of results is highly consistent with findings reported in the international literature on mindfulness interventions in athletic populations. The meta-analytic synthesis by Bühlmayer et al. (2020), which included 19 randomized studies involving athletes from diverse sporting contexts, reported mean effect sizes of $d = 0.68$ for anxiety reduction and $d = 0.73$ for performance enhancement following mindfulness-based training, values that are comparable in magnitude to the effects observed in the present study, albeit somewhat smaller, possibly reflecting the greater methodological stringency of the current research and the unique characteristics of the Indonesian sample. The specific reductions observed in both cognitive and somatic anxiety dimensions in this study are particularly noteworthy, as these two subscales have been identified as the primary performance-disrupting components of competitive anxiety in high-pressure sports contexts (Woodman & Hardy, 2021).

From a theoretical standpoint, the findings provide empirical support for the integration of cognitive defusion principles drawn from Acceptance and Commitment Therapy (ACT) into sport-specific mindfulness programs. Cognitive defusion — the process of observing one's thoughts as transient mental events rather than objective truths — appears to have been particularly effective in reducing pre-competition worry and negative outcome expectancies in this sample (Birrer et al., 2021). The progressive and stepwise reduction in anxiety scores across the three time points suggests that the benefits of mindfulness training accumulate with sustained practice, reinforcing the importance of program duration and regularity of practice. This trajectory of change was more pronounced in the final four weeks of the intervention (T2 to T3) compared to the first four weeks (T1 to T2), which may reflect the deepening of mindfulness skills as participants moved from foundational awareness exercises to more complex cognitive defusion and performance integration practices (Rahardjo & Susanto, 2021).

Within the Indonesian cultural context, several distinctive patterns emerged that merit discussion. A number of participants in the experimental group reported that certain elements of the mindfulness program — specifically breath awareness and body scan techniques — resonated with their existing Islamic spiritual practices, such as focused prayer (shalat) and dhikr (contemplative remembrance of God). This cultural congruence may have facilitated greater engagement with and acceptance of mindfulness practices among participants, potentially amplifying intervention outcomes in this population (Nugroho et al., 2022). This observation suggests that mindfulness interventions delivered in predominantly Muslim Indonesian settings may benefit from explicit integration of culturally and religiously compatible frameworks, a recommendation that has been advanced in the broader literature on culturally adapted mental health interventions (Prasetyo & Wibowo, 2022).

The study is not without limitations. The use of a quasi-experimental rather than fully randomized design, while practically necessary, introduces the possibility of selection biases that cannot be fully eliminated through group matching. The relatively small sample size (n=30) limits the statistical power to detect small effects and restricts the generalizability of findings to athletes in other sports or institutional contexts. Additionally, the absence of objective physiological measures of anxiety — such as cortisol assays, heart rate variability, or galvanic skin response — means that the study relied exclusively on self-report data, which are subject to social desirability bias and demand characteristics. Long-term follow-up data beyond the eight-week intervention period were not collected, leaving the durability of anxiety reductions unknown. Future research should address these limitations through larger-scale randomized controlled trials with objective physiological measures and extended follow-up periods (Hidayat & Amir, 2022).

CONCLUSSION

This study provides robust empirical evidence for the effectiveness of an eight-week structured mindfulness-based intervention in significantly reducing competitive anxiety among student-athletes at the Faculty of Sports and Health Sciences, Universitas Negeri Makassar. Significant and practically meaningful reductions were observed in both cognitive anxiety (mean reduction of 30.8%) and somatic anxiety (mean reduction of 29.6%), along with a substantial increase in self-confidence (mean gain of 34.0%) in the experimental group following the intervention. These outcomes were significantly greater than those observed in the waitlist control group across all CSAI-2 subscales, with large effect sizes (Cohen's d ranging from 2.67 to 2.79) underscoring the practical significance of the findings. The stepwise reduction in anxiety across the three measurement time points indicates that the benefits of mindfulness training accumulate progressively with sustained practice, highlighting the importance of structured, multi-week program implementation. Cultural observations from the Indonesian context suggest that mindfulness techniques may be particularly well-received when delivered in ways that acknowledge and resonate with participants' existing spiritual and cultural practices. Based on these findings, it is recommended that sport psychology practitioners, coaches, and sports science educators at Indonesian universities consider the formal integration of mindfulness-based mental skills training into athlete development programs. Future research should prioritize larger-scale randomized controlled trials, objective psychophysiological measurement, and culturally adapted program designs to further establish the evidence base for mindfulness interventions in Indonesian competitive sports.

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