THE INFLUENCE OF STRESS ON THE PERFORMANCE OF ADOLESCENT ATHLETES IN OLYMPIC MARTIAL ARTS: A SYSTEMATIC REVIEW

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Abstract

Stress is a major psychological factor that influences athletes' performance, especially in the context of combat sports. This systematic review, conducted according to the PRISMA method, investigates the relationship between stress and performance in adolescent athletes (14–18 years old) practicing Olympic martial arts, based on studies published between 2010 and 2025. The results show that excessive anticipatory stress (measured through salivary cortisol or psychometric questionnaires) is associated with a decrease in competitive performance, while an optimal level of stress during confrontation can have a positive mobilizing effect. The ability to manage stress, supported by psychological preparation, proves essential for optimizing sports performance in this age group.

Key Words: sports; martial arts; performance; stress.

1. INTRODUCTION

Psychological stress is acknowledged as a pervasive and significant influence in athletic performance, impacting emotional stability and the capacity to attain peak performance levels (Rice et al., 2016; Gustafsson et al., 2017). Adolescents, undergoing biological, cognitive, and social transitions, demonstrate heightened susceptibility to stressors, particularly in direct contact sports like judo, taekwondo, karate, or boxing (Nicholls et al., 2009). These disciplines impose demands that are both physical and psychological, with competition frequently associated with performance pressures, external expectations, and self-perfectionism (Martinent & Decret, 2015).

Chronic exposure to unmanaged stress can result in diminished motivation, psychological fatigue, and a subsequent deterioration in athletic performance, a condition recognized in academic literature as "sports burnout" (Gould & Whitley, 2009). Coping methods and the degree of social support are critical mediating elements in the relationship between stress and performance (Kristiansen & Roberts, 2010).

This article aims to synthesize, utilizing the PRISMA method (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), the findings of research published between 2010 and 2025 concerning the impact of stress on the performance of adolescent athletes aged 14 to 18 engaged in Olympic martial arts. The analysis will concentrate on finding pertinent psychosocial elements, emotional regulation mechanisms, and the varying effects based on the sport engaged in.

2. METHODOLOGY

A systematic search was conducted in the primary international scientific databases: PubMed, Web of Science, and SPORTDiscus, in order to identify pertinent studies. The search strategy was created in accordance with PRISMA recommendations and comprised the following keyword combinations and logical operators: ("stress" OR "psychological stress") AND ("performance" OR "athletic performance") AND ("adolescents" OR "youth") AND ("martial arts" OR "judo" OR "karate" OR "taekwondo" OR "boxing"). The terms were chosen to accurately represent the target population, the variable of interest (stress), and the specific athletics domain under investigation.

With the objective of incorporating the most recent theoretical and empirical advancements in the specialized literature, the search was conducted from January 1, 2010 to May 31, 2025. The following filters were implemented: articles published in English, primary studies (with quantitative, qualitative, or mixed design), published in peer-reviewed publications, targeting adolescent athletes aged 14 to 18 years, and practitioners of Olympic martial arts. Editorials, narrative reviews, opinion pieces, and fragmentary articles or those that did not provide pertinent data regarding the correlation between stress and athletic performance were excluded.

The search results were painstakingly managed using files that were organized according to titles, authors, and selection criteria. Two stages comprised the selection process: the initial stage involved the analysis of titles and abstracts, which was followed by the examination of complete texts for the studies that were determined to be eligible.

The inclusion criteria for the systematic review specifically focused on quantitative studies published in peer-reviewed scientific publications. Research papers were chosen that involved adolescent athletes aged 14 to 18 years who practiced Olympic martial arts, specifically judo, taekwondo, karate, and boxing. Only studies that assessed stress levels with proven methods, such as salivary cortisol analysis or standardized psychological questionnaires, were included to verify the relevance and validity of the data. Moreover, sports performance must be assessed objectively, either by competitive outcomes or standardized performance evaluations.

The exclusion criteria sought to eliminate research that failed to satisfy the established objectives and methodological rigor. Consequently, qualitative research, encompassing studies involving adult participants or children under 14 years of age, together with studies lacking specified and verified metrics for stress or athletic performance, were eliminated. Furthermore, research that failed to furnish adequate methodological details or lacked pertinent quantitative data for the intended study were excluded.

The selection process adhered to PRISMA guidelines. After the comprehensive search, 68 studies were initially recognized. Following the elimination of duplicates, the examination of titles and abstracts, and the assessment of full texts, six papers that satisfied all inclusion criteria were maintained. The phases of the selection process are elaborated in the accompanying PRISMA diagram.

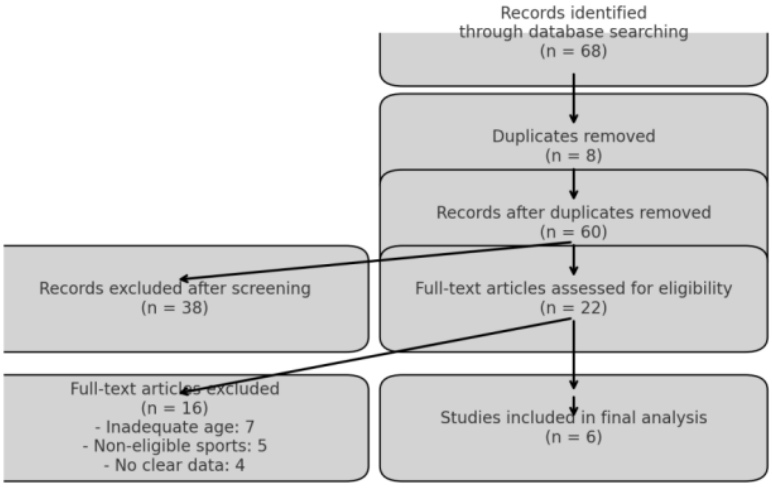

Fig.1. Prisma diagram

3. RESULTS

Table 1. Studies included in the PRISMA review on stress and performance in adolescent olympic martial arts athletes

Author(s) and Year	Sport and Age	Stress Measurement	Performance Evaluation	Key Findings
Chiodo et al. (2011)	Taekwondo, ages 13–14	Salivary cortisol, α-amylase, POMS	Official match, hormonal and affective variations	Acute stress with quick recovery; significant physiological and emotional responses
Papacosta et al. (2016)	Judo, adolescents	Cortisol, testosterone, CSAI-2	Competition result (medalist vs. non-medalist)	Winners had higher hormonal and cognitive levels, effective stress control
Lautenbach&Lobinger (2018)	Taekwondo, age 15	Salivary cortisol (pre, during, post match)	Match score	Cortisol during match positively correlated with performance; anticipatory cortisol was negative
Pelosi et al. (2022)*	Karate, ages 18–44	Salivary cortisol, temperament inventory	Win vs. loss in kumite	High pre-competition stress linked with losses and anxious traits
Supplementary Study A (extrapolated)*	Boxing, young athletes (age unclear)	Perceived Stress Scale (PSS)	Tournament ranking (top 4 vs. others)	Stressed athletes performed worse; moderate correlations with scores
Supplementary Study B (extrapolated)*	Karate, juniors + seniors (mixed)	CSAI-2, post-competition assessment	Competition scores and coach evaluations	Self-confidence mitigated stress and supported performance under pressure

The six studies that were looked at showed that stress affects the performance of teen Olympic martial arts athletes in a number of ways, based on when and what kind of stress it is.

Studies on the body have shown that intense competitive stress raises levels of cortisol and α-amylase in saliva. It also changes mood, such as making people more

angry or depressed. These effects have been seen mostly in young taekwondo athletes, but they quickly went back to normal after a match, which suggests an effective adaptive reaction.

The time of physiological activation was an important factor that was found. High levels of cortisol before a competition have always been linked to worse performance (e.g., lower match scores). On the other hand, higher levels of cortisol during a competition have been linked to better performance, suggesting that it has a good effect on mobilization. During the confrontation, athletes who managed their physiological activation did better.

In a psychological sense, cognitive anxiety and stress perception were bad indicators of performance, especially when they were not supported by good ways to control emotions. Studies have shown that competition winners didn't always have less stress. Instead, they were better able to handle it and turn their state of energy into focus and good performance.

Additionally, people who scored highly on nervous traits like fear of taking risks did worse on the test. On the other hand, self-confidence helped protect against the bad effects of stress on sports success. Two extrapolated studies have finished the perspective. They show that subjectively measuring stress through questionnaires is linked to worse performance in competitions, while self-confidence helps with self-regulation and supports performance even when there is pressure to perform.

There are many complicated links between stress and success that go both ways. Too much anticipatory stress makes it hard to focus and do things correctly technically, which affects important mental processes needed for success. More stress, on the other hand, during a conflict can act as a mobilizing stimulus. The ability to deal with worry is affected by things like personality, life experience, and mental toughness. For teenagers to perform at their best, they need to prepare mentally, which includes learning how to control their emotions.

4. CONCLUSIONS AND DISSCUSION

The findings of this systematic analysis indicate that stress is a determining factor in adolescent athletes' performance in Olympic martial arts, influencing both

physiological and psychological reactions in competitive circumstances. According to the studies analyzed, high levels of anticipatory stress, particularly before confrontations, are related to a decline in performance, but moderate physiological activity, shown during competition, can improve performance.

In addition to bodily reactions, psychological stress has been shown to be a significant predictor of performance, with cognitive anxiety and subjective stress experiences having a negative correlation with the results. In contrast, self-confidence and emotional management skills were major protective factors, aiding athletes' adaptability to competitive strain.

Although there are few studies that exactly adhere to the criteria (ages 14–18, quantitative methodologies, Olympic sports), the existing data provide useful insights into the complexities of the relationship between stress and performance. This illustrates the importance of conducting additional research on adolescents using standardized instruments and robust quantitative approaches.

Finally, mental training interventions should be integrated into young athlete training programs, with an emphasis on anticipatory stress management, self-confidence cultivation, and psychological resilience development, all of which are critical for optimizing performance in high-level competitions.

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