

Sleep Disturbances in Elite Athletes: Psychological Mechanisms, Performance Implications, and Evidence Based Interventions

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ABSTRACT

Objective: To systematize current data on sleep disturbances in high performance athletes, their psychological mechanisms, impact on mental health and sports performance, and to propose evidence based strategies for psychological counselling. **Methods:** The review analyzes findings from recent studies in the fields of somnology, sports psychology, and psychiatry (2013–2024), including meta analyses, randomized controlled trials, and neuroimaging studies. Particular attention is given to the relationship between sleep, stress, and cognitive functions in athletes.

Results: It has been established that sleep disturbances affect 58–70 % of elite athletes and are associated with:

- An increased risk of injuries (1.7 fold higher with chronic sleep deprivation);
- A decline in sports performance (up to 3.1 % reduction in sprint disciplines);
- Impaired cognitive functions (reduced prefrontal cortex activation);
- Increased psychological stress and anxiety.

The most effective interventions include cognitive behavioral therapy for insomnia (CBT I, 70–80 % efficacy), mindfulness based programs, and biofeedback.

Conclusions: Sleep disturbances in athletes represent a multifactorial issue requiring an interdisciplinary approach. Implementing sleep screening into athletes' medical monitoring, training sports psychologists in CBT I techniques, and developing individualized sleep hygiene protocols can significantly improve mental health and athletic achievements.

Vol No: 11, Issue: 01

Received Date: February 14, 2026

Published Date: April 24, 2026

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Citation: Fursov IV, et al. (2026). Sleep Disturbances in Elite Athletes: Psychological Mechanisms, Performance Implications, and Evidence Based Interventions. *Mathews J Psychiatry Ment Health*. 11(1):59.

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Keywords: Sleep in Athletes, Sleep Disturbances, Cognitive Behavioral Therapy for Insomnia (CBT I), Psychological Counselling, Stress and Sports, Sleep Hygiene, Mental Health of Athletes.

INTRODUCTION

Sleep is a cornerstone of physical recovery, cognitive function, and emotional regulation. For elite athletes, whose performance depends on optimal physiological and psychological states, sleep quality is particularly critical. However, the unique stressors of high performance sports — intense training loads, competition pressure, travel, and injury risks — often disrupt sleep patterns. This review synthesizes current evidence on the prevalence, psychological mechanisms, and consequences of sleep disturbances in athletes, and proposes evidence based strategies for psychological counselling and intervention.

Sleep is one of the main sources of strength, health, and energy for every individual. Thanks to healthy and rational sleep, a person is able to rest and replenish physical and psychological strength. If the sleep structure becomes imbalanced and disrupted, it leads to systematic sleep deprivation, which subsequently affects a person's overall well-being [1].

Therefore, studying the structure of sleep and its rational application in everyday life is an extremely relevant issue in modern realities. In contemporary society, the question of improving quality of life is acute — not only in terms of material resources, but also in terms of human health. A healthy lifestyle is coming to the forefront, where the foundation is not sport, nutrition, and systematic exercise, but healthy and restful sleep. Thus, the problem addressed in this article is to find the necessary theoretical justification for introducing sleep counselling for athletes into modern practice [2]. This is especially relevant for athletes, as they are inherently at higher risk of sleep disturbances due to their significantly higher levels of physical activity compared to the average person [3]. As physical load increases, so does the overall level of psychological stress and fatigue, which negatively affects athletes' sleep. Consequently, sleep disturbances are often observed in this group [4].

Prevalence and Risk Factors

Recent studies indicate that sleep disturbances affect 58–70 % of elite athletes, with higher rates in individual sports (70 %) compared to team sports (58 %). Key risk factors include:

- **Physical stress:** High training volumes elevate cortisol and adrenaline, delaying sleep onset.
- **Psychological stress:** Pre competition anxiety, fear of injury, and performance pressure activate the sympathetic nervous system. systematic psychological stress due to constant injuries, competitions, etc.;
- **Circadian disruptions:** Frequent travel across time zones and irregular schedules desynchronize circadian rhythms.
- **Cognitive hyperarousal:** Rumination about performance and self critical thoughts prolong sleep latency.
- **Pain and discomfort:** Musculoskeletal injuries and delayed recovery impair sleep quality.
- **Highly demanding schedules;**
- **Lack of opportunities for proper rest and balanced load distribution [5];**
- **Pre competition anxiety and performance pressure;**
- **Travel related disruptions (jet lag, unfamiliar environments);**
- **Hormonal fluctuations related to intense training.**

All these factors indicate that athletes face a considerable number of external and internal influences that negatively affect their healthy sleep [6].

Empirical evidence from recent studies

Recent research provides compelling evidence of the scope of sleep problems in elite sports:

- A 2022 study by Juliff et al. found that 64 % of elite athletes reported poor sleep quality, with the highest prevalence in individual sports (70 %) compared to team sports (58 %) [7].

- Research by Sargent et al. (2021) demonstrated that sleep restriction (≤ 5 hours per night) for 3 consecutive nights reduced sprint performance by 3.1 % and increased perceived exertion by 17 % in team sport athletes [8].
- A meta analysis by Halson (2023) revealed that athletes with chronic sleep debt showed a 1.7 fold increased risk of injury compared to those obtaining ≥ 8 hours of sleep [9].
- Neuroimaging studies (Erlacher et al., 2020) have shown that sleep deprivation in athletes leads to reduced activation in the prefrontal cortex, impairing decision making and reaction times [10].
- **Motivation and resilience:** Fatigue and mood disturbances from poor sleep reduce training adherence and mental toughness.
- **Key perspectives from researchers**
- **Kasatkin V.N.** argues that sleep is a manifestation of a person's emotional state and level of psychological development. He emphasizes that sleep reflects a person's condition. Therefore, when counselling athletes on sleep, special attention should be paid to stress levels and emotional states [3].
- **Kovalzon V.M.** has devoted considerable attention to sleep as a reflection of human desires and aspirations. Thus, consultative work with athletes' emotional and psychological states should be based on their desires. It is more appropriate to address human needs for love, relationships, and care, rather than focusing solely on sports goals [4].
- **Yakupov E.Y.** asserts that sleep counselling is an interdisciplinary issue. It cannot be confined to a single field, as it involves psychology, pedagogy, sociology, and more. Therefore, when designing sleep consultations for athletes, it is crucial to gather extensive information about their activities. Individualized approaches are essential, as no two individuals should be treated identically [11].

Psychological and Neurobiological Mechanisms

Sleep disturbances in athletes are not merely a consequence of physical load but are deeply intertwined with psychological states:

- **Emotional regulation:** Poor sleep reduces prefrontal cortex activation, impairing emotion regulation and increasing irritability [10].
- **Stress response:** Chronic sleep debt amplifies cortisol secretion, creating a vicious cycle of hyperarousal and insomnia [9].
- **Cognitive performance:** Sleep deprivation impairs reaction time, decision making, and working memory — critical skills in competitive sports [8].

Additional insights from other researchers

Researcher	Key Idea
Manov F.A.	Dreams reflect internal stimuli; the objectification of sleep [12]
Dzhailov L.P.	Sleep counselling is a crucial task in sports and should not be ignored [1]
Gnezditsky V.V.	Healthy sleep is essential for everyone, especially athletes due to high physical loads [2]
Kovalzon V.M.	Dreams reflect the integrity of human nature and psyche [5]
Lurie M.L.	The psychology of sleep and wakefulness are not always meaningfully connected; thus, deep psychological issues in athletes must be addressed during consultations [13]
Rudnev V.P.	Dreams reflect human emotions; therefore, consultations should focus on working with these emotions [14]

International perspectives and evidence based interventions

International scholars have also deeply studied this issue. One prominent figure is Morin C.M., who has repeatedly

pointed out that sleep counselling receives insufficient attention in modern practice. This is one of the key issues in contemporary psychology and sociology. It is impossible to accurately assess the emotional and psychological state of a person — particularly an athlete — without examining

their sleep, as, according to **Morin C.M.**, true consciousness is revealed in sleep. Sleep disturbances indicate underlying issues in a person's inner state [15].

Recent developments in clinical psychology offer promising interventions:

1. Cognitive Behavioral Therapy for Insomnia (CBT I) has demonstrated 70–80 % efficacy rates in athlete populations (Edinger et al., 2023), outperforming pharmacological approaches without side effects [16].

2. Mindfulness Based Stress Reduction (MBSR) protocols adapted for athletes showed significant improvements in sleep onset latency (–28 min) and sleep efficiency (+15 %) in a randomized trial by Grossman et al. (2022) [17].

3. Sleep Hygiene Education specifically tailored to training schedules resulted in 45 min more total sleep time per night in Olympic swimmers (Lastella et al., 2021) [18].

4. Biofeedback and Neurofeedback training helped reduce pre sleep arousal and improved sleep quality in 82 % of participants in a study with professional footballers (Hartmann et al., 2023) [19].

Principles of effective psychological counselling for athletes with sleep disturbances

Based on the accumulated evidence, the following key principles should be followed:

- Recognize that athletes are individuals with high levels of emotional stress;
- Acknowledge that stress levels are significantly higher in athletes with sleep disturbances;
- Ensure utmost caution on the part of the psychologist;
- Understand that most athletes are strong willed individuals; thus, it is important to help the athlete realize that improving their routine is in their own best interest;
- Demonstrate practical situations;
- Model scenarios for the athlete in which poor sleep negatively affects both psychological and physical states [20];

- Integrate evidence based interventions like CBT I and MBSR;
- Coordinate with sports medicine professionals for holistic care;
- Monitor sleep using objective measures (actigraphy, sleep diaries) alongside subjective reports.

It is also crucial not to overlook the fact that the effectiveness of psychological counselling for athletes with sleep disturbances directly depends on the psychologist's attitude toward their work. It is vital to recognize the level of responsibility and organize one's activities to meet all necessary requirements, while maintaining a positive attitude toward clients. As previously mentioned, athletes can be a challenging group to work with due to their strong, willful natures, firmly held opinions, and other factors that hinder the effectiveness of psychological counselling [21].

Performance and Health Consequences

Empirical evidence highlights the tangible impact of sleep on athletic outcomes:

- **Injury risk:** Athletes with < 8 hours of sleep have a 1.7 fold higher injury risk [9].
- **Performance decline:** 3 consecutive nights of ≤ 5 hours sleep reduce sprint performance by 3.1 % and increase perceived exertion by 17 % [8].
- **Recovery impairment:** Reduced slow wave sleep compromises muscle repair and glycogen replenishment.
- **Mental health:** Chronic insomnia is linked to higher rates of depression, anxiety, and burnout in athletes [16].

Evidence Based Interventions

1. Cognitive Behavioral Therapy for Insomnia (CBT I)

- 70–80 % efficacy in athlete populations [16];
- Targets maladaptive thoughts about sleep, stimulus control, and sleep restriction;
- Superior to pharmacological approaches without side effects.

2. Mindfulness Based Stress Reduction (MBSR)

- Reduces sleep onset latency by 28 min and improves sleep efficiency by 15 % [17];
- Cultivates non judgmental awareness of thoughts and bodily sensations.

3. Sleep Hygiene Education

- Tailored to training schedules (e.g., post training wind down routines);
- Increases total sleep time by 45 min/night in Olympic swimmers [18].

4. Biofeedback and Neurofeedback

- Trains athletes to regulate physiological arousal (heart rate, muscle tension);
- Improves sleep quality in 82 % of professional footballers [19].

5. Multidisciplinary Collaboration

- Integration with sports medicine, nutrition, and coaching staff.

Counselling Principles for Sport Psychologists

Effective psychological support for athletes with sleep disturbances should:

- Adopt an individualized approach, considering sport specific stressors;
- Address both performance anxiety and personal emotional needs;
- Use objective sleep monitoring (actigraphy, sleep diaries);
- Emphasize athlete autonomy and self efficacy;
- Coordinate with medical teams for holistic care [22-28].

Recommendations for practice:

- Implement routine sleep screening in athlete medical assessments;
- Train sports psychologists in evidence based sleep interventions;

- Develop team specific sleep protocols considering training schedules and competition calendars;
- Integrate sleep education into athlete development programs from youth levels upward;
- Establish multidisciplinary teams including psychologists, sleep specialists, and coaches to address sleep issues comprehensively.

Future research should focus on longitudinal studies examining the long term effects of sleep interventions on athletic careers and developing digital tools for sleep monitoring and counselling in real world training environments.

CONCLUSIONS AND RECOMMENDATIONS

The comprehensive analysis of sleep disturbances in elite athletes reveals several critical conclusions:

- **Prevalence and Impact.** Sleep disorders affect 58–70% of elite athletes, significantly impacting their performance and injury risk. Chronic sleep deprivation increases injury likelihood by 1.7 times and reduces sprint performance by up to 3.1%.
- **Complexity of the Issue.** Sleep disturbances in athletes are multifactorial, involving physical, psychological, and environmental factors that require an integrated approach to resolution.

Evidence-Based Recommendations

1. Screening and Monitoring:

- Implement routine sleep screening as part of athletes' medical assessments
- Use objective measures (actigraphy, sleep diaries) alongside subjective reports
- Establish baseline sleep metrics for each athlete

2. Intervention Strategies:

- Adopt CBT-I as a primary intervention (demonstrated 70–80% efficacy)
- Integrate mindfulness-based programs for stress reduction

- Implement personalized sleep hygiene protocols
- Utilize biofeedback and neurofeedback techniques

3. Professional Development:

- Train sports psychologists in evidence-based sleep interventions
- Develop specialized knowledge in athlete-specific sleep issues
- Foster collaboration between psychologists, sleep specialists, and coaching staff

Practical Implementation

1. Systematic Approach:

- Develop team-specific sleep protocols
- Integrate sleep education into athlete development programs
- Create multidisciplinary teams for comprehensive care

2. Tailored Solutions:

- Address both sport-specific stressors and personal psychological factors
- Provide individualized counseling
- Adapt interventions to cultural backgrounds and personal needs

FUTURE RESEARCH DIRECTIONS

1. Longitudinal Studies:

- Conduct long-term research on sleep interventions across athletic careers
- Track the impact of sleep optimization on performance and well-being

2. Technological Advances:

- Develop and validate digital tools for real-time sleep monitoring
- Explore innovative counseling methods using technology

3. Diverse Populations:

- Create culturally adapted interventions
- Study sleep patterns in different sports disciplines
- Investigate age-specific sleep needs in athletes

FINAL RECOMMENDATIONS

To maximize the effectiveness of sleep interventions, it is crucial to:

- Recognize sleep as a critical component of athletic performance
- Adopt a holistic approach combining medical, psychological, and educational strategies
- Ensure continuous monitoring and adjustment of sleep protocols
- Foster a culture that prioritizes sleep health alongside physical training

By implementing these recommendations, sports organizations can significantly improve athletes' well-being and competitive success, transforming how sleep health is managed in elite sports.

FUNDING

No funding.

ACKNOWLEDGMENTS

No acknowledgments.

CONFLICTS OF INTERESTS

No conflicts of interests of any sort beyond.

INFORMED CONSENT

None to declare.

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