



Original research

Understanding sleep disturbance in athletes prior to important competitions



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ABSTRACT

Objectives: Anecdotally many athletes report worse sleep in the nights prior to important competitions. Despite sleep being acknowledged as an important factor for optimal athletic performance and overall health, little is understood about athlete sleep around competition. The aims of this study were to identify sleep complaints of athletes prior to competitions and determine whether complaints were confined to competition periods.

Design: Cross-sectional study.

Methods: A sample of 283 elite Australian athletes (129 male, 157 female, age 24 ± 5 y) completed two questionnaires; Competitive Sport and Sleep questionnaire and the Pittsburgh Sleep Quality Index.

Results: 64.0% of athletes indicated worse sleep on at least one occasion in the nights prior to an important competition over the past 12 months. The main sleep problem specified by athletes was problems falling asleep (82.1%) with the main reasons responsible for poor sleep indicated as thoughts about the competition (83.5%) and nervousness (43.8%). Overall 59.1% of team sport athletes reported having no strategy to overcome poor sleep compared with individual athletes (32.7%, $p = 0.002$) who utilised relaxation and reading as strategies. Individual sport athletes had increased likelihood of poor sleep as they aged. The poor sleep reported by athletes prior to competition was situational rather than a global sleep problem.

Conclusion: Poor sleep is common prior to major competitions in Australian athletes, yet most athletes are unaware of strategies to overcome the poor sleep experienced. It is essential coaches and scientists monitor and educate both individual and team sport athletes to facilitate sleep prior to important competitions.

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1. Introduction

Within elite sport, success is underpinned by optimal preparation¹ and, equally important, adequate recovery between training and during competition.^{2,3} Sleep has been recognised as an essential component for athlete preparation and is suggested to be the single best recovery strategy available to an athlete.^{4,5} Despite the importance of sleep for athletic performance, data on elite athletes is limited.⁵ Anecdotal reports suggest athletes often sleep worse around competition periods, particularly the night(s) prior to an important competition.^{6,7} With reduced sleep shown to negatively influence performance this reduction may become problematic.^{8,9} Sleep deprivation studies in athletes has found decreased anaerobic performances through decreased mean

and total sprint time in team sport athletes after 30 h of sleep deprivation¹⁰ and decreased aerobic performance following 24 h of reduced sleep.¹¹ Whilst it may be seldom that athletes experience total sleep deprivation prior to competition, acute partial sleep deprivation may exist. One night of poor sleep in athletes is associated with reduced reaction times,¹² reduced anaerobic performance the following afternoon in football players¹³ and declines in cognitive processes such as visual tracking, focus, determination and mood.^{14,15} As many sports rely on fine motor movements and the ability to make fast accurate decisions, reduced sleep in athletes is a genuine concern.¹⁶

As it is possible that sleep quantity and quality may influence performance,¹⁷ there is a growing need to understand sleep patterns in elite athletes. To date, relatively few studies exist that provide this information.^{3,19,20} In a survey of 632 German athletes prior to competition, 65.8% acknowledged worse sleep than normal at least once before a competition, indicating their main issue to be “problems falling asleep” (79.9%), due to “thoughts about

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Table 1
Distribution of athletes by sport.

Individual	Team
Athletics <i>n</i> = 21	Basketball <i>n</i> = 14
Canoe/Kayak <i>n</i> = 6	Football (soccer) <i>n</i> = 24
Cycling <i>n</i> = 17	Hockey <i>n</i> = 30
Gymnastics <i>n</i> = 3	Netball <i>n</i> = 30
Moguls <i>n</i> = 1	Rugby League <i>n</i> = 15
Rowing <i>n</i> = 4	Rugby Sevens <i>n</i> = 44
Sailing <i>n</i> = 2	Softball <i>n</i> = 14
Short Track Speed Skating <i>n</i> = 1	Volleyball <i>n</i> = 10
Ski Cross <i>n</i> = 3	Waterpolo <i>n</i> = 4
Surf Life Saving <i>n</i> = 1	Wheelchair Basketball <i>n</i> = 19
Swimming <i>n</i> = 9	Wheelchair Rugby <i>n</i> = 6
Tennis <i>n</i> = 3	
Triathlon <i>n</i> = 1	
Power Lifting <i>n</i> = 1	

the competition/game” (77%) and because of this “increased day-times sleepiness” with athletes indicating “no special strategy” to enhance sleep.⁶ These findings provide valuable information on sleep habits of the elite athlete and provide a stimulus for further investigation. Furthermore, if elite athletes do present as “poor” sleepers it is important to differentiate poor competition sleep from chronic sleep issues if coaches, athletes and sports scientists hope to use this knowledge to enhance future performance.

The purpose of this study was to document the occurrence of sleep disturbances in athletes prior to important competitions and/or games. If sleep disturbances were indicated by athletes, we aimed to examine the particular problems, reasons and perceived consequences associated with the sleep disturbance. In addition from the information obtained we sought to determine whether a particular group of athletes had an increased likelihood of sleep disturbance. This study additionally aimed to provide a comprehensive analysis of whether individual versus team sport athlete sleep habits differ. Finally, a novel aspect of the study was to establish whether sleep disturbances are a general complaint present on a day-to-day basis in athletes or whether it is merely situational.

2. Methods

A sample of 283 elite Australian athletes (mean ± SD; age: 24 ± 5 y, age range: 16–47 y) volunteered to participate in the study from a variety of Australian sports (Tables 1 and 2). Athletes were recruited from the Australian Institute of Sport, Australian Winter Olympic team, Australian Paralympic team and National Sporting Organisations through personal contact with researchers or through coaching and/or support staff. All athletes were at an international level or were members of professional teams. The athletes sampled had competed in their sport for a mean of 11 ± 6 y, trained on average 16:42 ± 6:42 h per week, slept on average 7:42 ± 0:54 h per night and had competed in 14 ± 13 important competitions or games in the past 12 months (Table 2). Ethical approval was obtained through Murdoch University and the Australian Institute of Sport ethics committees prior to data collection.

In the period prior to (1 month) and following (7 months) the 2012 Olympic games, participants were asked to complete two questionnaires regarding their sleep (Competitive Sports and Sleep Questionnaire⁶ and the Pittsburgh Sleep Quality Index²¹) either online (Survey Monkey©) or through hard copy.

The Competitive Sports and Sleep Questionnaire,¹⁰ previously described by Erlacher and colleagues,⁶ is a sport specific questionnaire used to assess sleep habits and dreams of athletes prior to important competitions and games. The questionnaire is divided into three main sections. The first section is used to obtain demographic data and information about the athlete’s chosen sport. This information was used to categorise athletes into male and female,

team sport or individual sport and in season or out of season at the time of answering the questionnaire, for statistical purposes. The subsequent section aimed to obtain information on athlete sleep habits prior to important competitions or games. If an athlete answered “yes” to having poor sleep at least once before an important competition or game in the past year, they were required to complete a further four closed response questions.

The initial closed response question assessed the types of sleep problems the athlete experienced. The response options were; “problems falling asleep”, “waking up at night”, “waking up early in the morning”, and “unpleasant dreams” with the first three options referring to typical sleep problems associated with insomnia. The second question addressed reasons for the sleep disturbance; “not used to surroundings”, “noises in the room or from outside”, “nervousness about competition/game”, and “thoughts about the competition/game”. The third question addressed the perceived consequences of poor sleep with options including; “no influence”, “bad mood the following day”, “increased daytime sleepiness”, and “poorer performance in competition”. In the fourth question, athletes report on the strategies used to deal with sleeping problems with responses; “no special strategy”, “methods to relax”, “sleeping pills”, “reading”, and “watching TV”.

In the final section of the questionnaire, an additional series of questions were used to obtain information regarding general sleep habits and training. Within this section athletes answered questions such as; “If you have a late training session or game do you find it hard to sleep after?” and “Do you take sleeping medication?”.

The validated Pittsburgh Sleep Quality Index (PSQI) has been used throughout numerous sleep studies as a standardised sleep questionnaire estimating general sleep quality,²¹ however there has been limited use in athletes.¹⁶ For the current study the questionnaire was used to identify ‘good’ or ‘poor’ sleepers. Prior to filling out the PSQI athletes were notified that all answers were to indicate the most accurate reply for the majority of days and nights in the past month only. Seven component scores were generated (using a 0–3 scale): subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. From the sum of the seven component scores a global score (range, 0–21) was calculated.^{22,23} If an athlete scored between 0 and 5 they were classed as a ‘good sleeper’ as specified by the PSQI and a score above 5 classed an athlete as a ‘poor sleeper’.²¹

Differences for age, years in sport, practice hours per week and sleep per night between the groups for gender, sport and time of season the questionnaire was answered were analysed using an independent sample *t*-test for the continuous variables. The percentage of athletes who responded “yes” to reporting poor sleep the night before an important competition or game in the past year was calculated. For the “yes” respondents, associations between categorical variables for sex (female versus male), sport groups (individual versus team sports) and time of season the questionnaire was answered (in season versus out of season) was calculated for each sleep disturbance question using a 2 × 2 frequency table and Pearson’s chi-squared test (χ^2). To determine whether an association existed between athletes who reported “yes” or “no” to sleep disturbance prior to a competition and athletes who were classed as generally ‘good’ or ‘poor’ sleepers through the Pittsburgh Sleep Quality Index, a chi-squared test was calculated. A binary logistic generalised linear model was run to ascertain the effects of the dichotomised variables age, gender, sport and athletes in or out of season on the predicted likelihood of athletes having poor sleep prior to an important competition. All statistics were completed using SPSS© Statistics (version 19, IBM©, USA) and R (R Foundation for Statistical Computing, Vienna) statistical software programs with significance set to $p \leq 0.05$.

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