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Sleep Quality in College Athletes

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Abstract

Athlete sleep has been studied in controlled laboratory conditions. Investigations using all-night measurement of sleep (all-night polysomnograph), cortisol levels, and behavioral variables (mood, performance level) have identified some factors about athlete sleep. Afternoon training and sufficient time to recover after an event have been found to be significantly related to sleep quality. In an effort to understand the relationship between sleep and athletic performance, a case control study of athletes was conducted with college level athletes during the season and non-season intervals. Findings indicated factors of tiredness, variable sleep times and the value of sleep timing during recovery.

Keywords: Athletes; Academic; Sleep quality

Sleep Quality in College Athletes

College level athletes balance study, practice schedules and game schedules for a successful college career. The athlete has control over their approach to their schedule. It is that adolescent sleep is influenced by school schedule [1]. Findings measuring the sleep quality of young adult sleep have identified variable sleep patterns with strong influence from schedules (i.e., social, academic, athletic) [2]. The college athlete has a complicated schedule of courses, homework assignments, study schedules and team practice.

Sleep and Athletes

Baekeland and Lasky (1966) [3] analyzed results from ten college athletes sleep under three different conditions of exercise. All night sleep measurements of athlete sleep revealed that delta sleep was greatest following afternoon exercise (40.1%), intermediate on nights of evening exercise (35.4%) and least on nights following exercise (32.5%) [3]. One conclusion was that metabolic effects precipitated by central nervous system activation may have precipitated the fragmented sleep quality following evening exercise. Also of significance from this study's results is that delta sleep was at a higher level in the athletes as compared to non-athletes and those reported as non-sedentary [4]. In an investigation of time of day of maximal aerobic exercise, evening trainings as compared to afternoon resulted in markedly poor sleep quality [5] reported significant differences between groups of athletes as compared to non-athletes in terms of sleep patterns and psychological functioning. The higher sleep quality of the athletes had reduced sleep onset latency, number of awakenings and daytime tiredness as compared to non-athletes [5]. Jurimae et al. [6] reported sleep quality differences in athletes (college rowers) during training, performance and recovery from training corresponding to plasma cortisol levels. Highest cortisol levels were found on recovery days. Complimentary to these findings, [7] reported that conditions of reduced exercise had significant effects on sleep with more fragmented sleep. Measurements of mental capacity, concentration, and speed in athletes (ballet dancers) were correlated with reductions in sleep duration and increases in fragmented sleep [8]. Anderson reported negative impact on athletic performance from lack of sleep. The intensity of athletes exercise is affected by sleep loss [9].

These findings highlight the differences between athletes and non-athlete sleep quality. In season, or during training and exercise, for the athlete, is optimal for sleep quality. Furthermore, the timing of exercise is significant with afternoon time trainings as the most advantageous to good sleep quality.

In an effort to further understand the relationship of sleep quality a case control study was designed to measure sleep quality in college athletes during the season of their event and in non-season time. It is predicted that poor sleep quality will occur following evening athletic events for athletes as compared to morning or afternoon.

Method

Participants

Students taking introductory psychology courses at a small liberal arts college in the Midwest were invited to participate in the study. Ten students of the 168 students enrolled in introductory psychology courses signed up for studies in exchange for course credit. The inclusion criterion was being a college athlete at the club, junior varsity or varsity level. No data was available about the number of athletes in the pool of 168 students. Three of the ten subjects dropped out due to disinterest. Five females and two males aged 19-20 years, completed the study. The study had internal review board approval.

Instruments

A stand interview about participants' sleep in terms of bedtime, wake times, minutes to fall asleep, number of wake ups, sleep environment, optimal time of alertness, effect of traveling for team on sleep, daytime sleepiness, sleep during athletic performance and following athletic performance. Each participant completed a standard sleep log during one week in season of their event and during non-season.

Procedure

Each participant was given a full explanation of the study and provided with a consent form. All participants were individually interviewed by the first author. Following this, they were given an

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explanation on how to complete the sleep log. An assignment to complete one week of sleep logging during their season of play and one week out of season. The sleep log data were summarized into variables of total sleep time, time in bed, bedtime, wake time and daytime sleepiness rating for each day by each participant.

Results

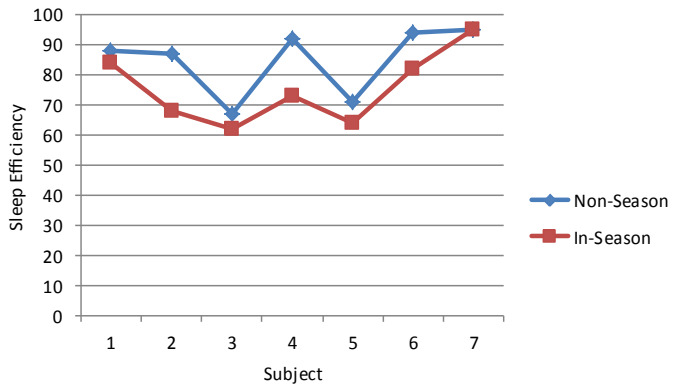
All responses from the interview questions were summarized. A content analysis of responses in terms of sleep reportings are presented in Table 1 and 2. A calculation of Sleep Efficiency (total sleep time/ time in bed (in minutes) X 100) was done for each day and averaged for the week for each participant. Figure 1 illustrates the average sleep efficiencies by participants for season and non-season days.

Discussion

In Table 2 varying bedtimes are noted. This is characteristic for a young adult population in general [2]. A majority, five of the seven participants, indicated late afternoon peak performance. This finding corresponds to an Evening Chronotype which is fairly common in the college student population [2]. The majority of participants' reporting sleepiness as influenced by the daytime sleepiness and feeling tired as reported in Tables 1 and 2. The travel time to an event, number and length of daily practices were reported to be both tiring and interrupting of sleep for the athletes. Further, the amount of sleep was found to be influential to recovery. Further, we believe the improved sleep efficiencies during non-season play reported by the athletes represent a time away from the practice/competition schedule for more sleep opportunities. These relationships are found in Table 1 and 2. Savis [10] has commented on the need of tracking the chronobiology or "body time" of the athlete.

Athlete	Daytime Sleepiness	Recovery Sleep Effects
1. Volleyball (female	No	More sleep needed
2. Volleyball (female)	Yes	No comment
3. Volleyball (female)	Yes	With lack of sleep, more soreness
4. Volleyball (female)	No	With lack of sleep, longer recovery
5. Wrestling (male)	No	With lack of sleep, more recovery time
6. Softball (female)	Yes	With lack of sleep longer recovery
7. Wrestling (male)	Yes	With lack of sleep, more recovery time

Table 1: Athlete Sleepiness resportings by daytime and need/no need for recovery sleep [1]. Recovery from practice, event schedule of the sport, and possibly.



Note: Based on two-week sleep logging of one week non-season play and one week in-season play.

Figure 1: Sleep Efficiency Average* by Athlete.

	Natural Bed Time	Peak Rhythm*	Travel Effect on Sport Performance
1	2100h	11 am – 3 pm	non-relaxing
2	2130h	2 pm	tiring
3	0100h	3 – 6 pm	tiring
4	2300h	3 – 6 pm	tiring
5	0230h	5 pm	tiring
6	1230h	1 – 4 pm	tiring
7	2230h	9 am	tiring
Note: * = Optimal time of energy, alertness and readiness			

Table 2: Athlete's Sleep Reportings.

A substantial difference was found between the sleep efficiency scores in season and out of season. Sleep efficiency was poorest during season play. We feel that these finding simply a need for further study of athletes' sleep quality. While this case-controlled study of a representative sampling of athletes is small, we think that findings point to differences in sleep quality at several points that are relevant to the athlete population, they are: season versus out of season, injury versus no injury, starting level-amount of playing time in competitions. Each of these points reflect a degree of intensity /time commitment on the athlete that potentially competes with their sleep quality. Our findings represent a starting point and we feel more study is warranted.

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