A Comparative Study of Sleep Quality in Athletes & Non Athletes

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Abstract

Background: As we know that sleep is important factor for all of us, but little is known regarding athlete sleep quality. It has been reported that sleep may be compromised in athletes by many factors, like increase in core temperature following exercise, increase in muscle tension, fatigue and pain following training and competition.

Objective: The objective of present study was to assess normative sleep quality among highly trained athletes.

Method: 50 athletes (short distance runners) & 50 non athletes were taken who were of 18 to 25 years. They were given Pittsburgh Sleep Quality Index (PSQI) questionnaire to assess their sleep quality. Results were statistically analysed using student 't' test.

Results: Different components of PSQI questionnaire were assessed in both case & control group. Component 1- subjective sleep quality, component 2- sleep latency, component 3- sleep duration, component 4- sleep efficiency were better in controls than athletes with a $p<0.05$. Component 5- sleep disturbance & component 7- daytime dysfunction scores were higher in athletes than controls ($p<0.05$). Component 6- use of sleep medication was not statistically significant. So, the overall global score was higher in athletes indicating better sleep quality in controls.

Conclusion: We conclude that controls have better sleep quality than athletes.

Keywords: *Athletes, sleep quality, PSQI.*

Introduction

An athlete is one who is involved for 3 hours daily training for 6 days per week.[1] Track-and-field athletics are the oldest forms of organized sport, it includes the most basic human activities—running, walking, jumping and throwing.[2] An athlete has to maintain high levels of performance. To achieve this, they must have an appropriate balance between training and Recovery.[3]

Sleep is a biological process that facilitates recovery from mental and physical demands of high-performance sport. Recently, there has been a proliferation of research exploring how sleep impacts recovery, training and performance in elite athletes. Previous research has indicated elite athletes have a high prevalence of poor sleep quality and insufficient sleep quantity.[4]

Also sleep has its role in various physiological processes, learning, memory and cognition. Habitual

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sleep duration varies in different individuals but there is still debate regarding the optimal amount of sleep a healthy adult need to maintain daytime function and performance. The National Sleep Foundation recommends that healthy adults should sleep for 7–9 hours per night and at least 8 h of sleep per night is required to prevent neurobehavioural deficits in daytime performance. Many studies say that when compared with healthy controls, the athletes took longer time to fall asleep, spent more time awake in bed, had lower sleep efficiency and higher sleep fragmentation.[3]

Sleep is one of the best forms of recovery available to an athlete, but there is evidence which suggest that athletes do not obtain sufficient sleep. The amount, quality and timing of sleep in elite athletes may be affected by many factors, such as training-practice schedules, training or exercise volumes, match schedules, nervousness due to competitions and sleep disorders.So, this study was taken to assess normative sleep quality among highly trained athlete.[5]

Objective: The objective of present study was to assess normative sleep quality among highly trained athletes.

Method

Atotal of 50 athletes (short distance runners) & 50 non athletes were taken who were of 18 to 25 years. The subjects where 50 athletes (short distance runners) & 50 non athletes with age group 18 to 25 years & where excluded by taking history of any Medical illness, any Psychiatric illness or any medications. They were given Pittsburgh Sleep Quality Index (PSQI) questionnaire to assess their sleep quality. The study protocol was fully explained to the subjects. Informed consent was taken by all subjects. Ethical clearance was taken from the institution. Results were statistically analysed using student 't' test.

Pittsburgh Sleep Quality Index (PSQI), a 19-item scale which assesses seven 'components' of sleep (sleep quality, sleep efficiency, sleep onset latency, sleep duration, sleep disturbance, daytime dysfunction and sleep medication use), summing the 'component scores' to deliver an overall 'global' score; global scores >5 indicate 'poor sleepers.[6]

The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

During the past month:

1. When have you usually gone to bed?
2. How long (in minutes) has it taken you to fall asleep eachnight?
3. What time have you usually gotten up in the morning?
4. A. How many hours of actual sleep did you get at night?

   B. How many hours were you in bed?

During the past month, how often have you had trouble sleeping because you	Not during the past month (0)	Less than once a week (1)	Once or twice a week (2)	Three or more times a week (3)
A. Cannot get to sleep within 30 minutes				
B. Wake up in the middle of the night or early morning				
C. Have to get up to use the bathroom				
D. Cannot breathe comfortably				
E. Cough or snore loudly				
F. Feel too cold				
G. Feel too hot				
H. Have bad dreams				
I. Have pain				
J. Other reason (s), please describe, including how often you have had trouble sleeping because of this reason (s):				

During the past month, how often have you had trouble sleeping because you	**Not during the past month (0)**	**Less than once a week (1)**	**Once or twice a week (2)**	**Three or more times a week (3)**
During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?				
During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?				
During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?				
During the past month, how would you rate your sleep quality overall?	**Very good (0)**	**Fairly good (1)**	**Fairly bad (2)**	**Very bad (3)**

Scoring of PSQI:

Component 1	#9 Score	C1
Component 2	#2 Score (<15min (0), 16-30min (1), 31-60 min (2), >60min (3)) + #5a Score (if sum is equal 0=0; 1-2=1; 3-4=2; 5-6=3)	C2
Component 3	#4 Score (>7(0), 6-7 (1), 5-6 (2), <5 (3)	C3
Component 4	(total # of hours asleep)/(total # of hours in bed) x 100>85%=0, 75%-84%=!, 65%-74%=2, <65%=3	C4
Component 5	# sum of scores 5b to 5j (0=0; 1-9=1; 10-18=2; 19-27=3)	C5
Component 6	#6 Score	C6
Component 7	#7 Score + #8 score (0=0; 1-2=1; 3-4=2; 5-6=3)	C7

Add the seven components cores together = Global PSQI=

Results

Table 1: Comparison between athletes & non athletes

Components	**Case**	**Control**	**P value**
subjective sleep quality	0.5±0.505	0.28±0.45	<0.05*
sleep latency	0.3±0.46	0.12±0.32	<0.05*
sleep duration	0.16±0.37	0	<0.05*
sleep efficiency	0.14±0.35	0	<0.05*
sleep disturbance	0.18±0.38	0.04±0.19	<0.05*
use of sleep medication	0.04±0.19	0	0.15
daytime dysfunction	0.12±0.32	0.02±0.14	<0.05*
Global score	1.7±0.73	1.26±0.59	<0.05*

Data are presented as the mean ± standard deviation* p value significant, ** p value highly significant

Different components of PSQI questionnaire were assessed in both case & control group. Component 1- subjective sleep quality, component 2- sleep latency, component 3- sleep duration, component 4- sleep efficiency was better in controls than athletes with a $p<0.05$.

Component 5- sleep disturbance & component 7- daytime dysfunction scores were higher in athletes than controls ($p<0.05$).

Component 6- use of sleep medication was not statistically significant.

So, the overall global score was higher in athletes indicating better sleep quality in controls.

Discussion

In PSQI questionnaire, Component 1- subjective sleep quality, component 2- sleep latency, component 3- sleep duration, component 4- sleep efficiency was better in controls than athletes with a $p<0.05$.

Component 5- sleep disturbance & component 7- daytime dysfunction scores were higher in athletes than controls ($p<0.05$).

There are a number of factors that influence amount and quality of sleep obtained by athletes. For example, travel, competition and intense training are all known to disrupt or reduce the amount and/or quality of sleep obtained by athletes. Among these, the timing of an athlete's training schedule may also be of importance.

The nights before training days, the athletes obtained less sleep compared with nights prior to rest days. The primary cause of this difference in sleep appears to be the fact that, on average, the athletes woke earlier on training days than on rest days. The athletes tried to wake up earlier on training days by going to bed earlier, but the difference in sleep onset times on nights before training days and rest days was only 1 hour. Some athletes used to take a short daytime naps on training days, they still obtained less sleep total on training days than on rest days. As a consequence of getting up early in the morning, there is reduction in sleep duration.[3]

In terms of cognitive performance, sleep supplementation in the form of napping has been shown to have a positive influence on cognitive tasks following a night of sleep deprivation. Naps can markedly reduce sleepiness and can be beneficial when learning skills, strategy ortactics. Napping may also be beneficial for athletes who have to wake early routinely for training or competition and those who are experiencing sleep deprivation.[7]

People who to get up early should be able to obtain a reasonable amount of sleep by going to bed earlier. However, there are two reasons why it is difficult to substantially advance one's bedtime. First reason can be from a lifestyle perspective, many people have social and family commitments in the evening which limits the extent to which they can advance their bedtime. Second reason is, physiologically, there is a period in the early evening when it can be difficult to initiate or maintain sleep even if one is in bed. The variation in sleep cycle is determined by a circadian process generated by an endogenous pacemaker that reflects the pressure for sleep that builds up during sustained wakefulness and dissipates during sleep periods. Sleep propensity is highest from 00:00 to 07:00 hours, then a secondary peak in the mid-afternoon can be seen, which is followed by a period of low sleep propensity in the early evening, when people can obtain very little sleep. This period of low sleep propensity has been termed the ''forbidden zone for sleep''. Consequently, going to bed earlier in preparation for an early morning training session does not necessarily guarantee that sleep duration is preserved–indeed, some individuals may not be able to initiate sleep at all because of this forbidden zone for sleep.[3]

Conclusion

Hence, we can conclude that controls have better sleep quality than athletes.

As we know very little about the sleep needs of athletes, particularly in terms of the amount required to reach and/or maintain optimal levels of performance. The results of the current study indicate that athletes obtain 7–9 hours per night and at least 8 h of sleep per night is required to prevent neurobehavioural deficits in daytime performance. One factor that affects amount of sleep an athlete obtains is the timing oft heir training. When designing schedules, coaches should be aware of the implications of the timing of training sessions for sleep and fatigue. In particular, schedules that require athletes to train early in the morning reduce sleep duration and increase pre-training fatigue levels. In future, it will be important to identify strategies for minimizing sleep loss in sports.

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