Sleep Disturbance and its Associated Risk Factors among Pakistani Athletes

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Abstract

Sleep is increasingly being an integral part of a training routine rather than a stagnant state of inactivity, and as a controllable factor that can modify performance for elite athletes. Athletes report high rates of sleep disturbance especially during intense workloads which directly affects athletic performance and may predispose individuals to injury. This study aimed to evaluate the quality of sleep and the various risk factors associated with it among Pakistani athletes. From February to April 2020, a cross-sectional, multi-center study was conducted involving athletes aged 18 and up, of either gender, from various cities in Pakistan... A validated Urdu version of the Pittsburgh sleep quality index (PSQI) instrument was used to identify sleep quality. Out of 205 participants, n=84 athletes were bad sleepers based on PSQI score. Of whom, the majority were males n=75 (89.3%), and having age group of 18-30 years n=71 (84.5%). Binary logistic regression demonstrated no statistically significant association between any of the factor and PSQI score.

The study found a disturbing quality of sleep in a considerable number of athletes. Therefore, interventions should be done to improve sleep quality so that the performance of the athletes can be improved.

Keywords: Sleep disturbance, Athletes, PSQI, Pakistan

Introduction

Sleep is a fundamental requisite for human health and serves critical psychological and physiological functions¹. To sustain the most favorable health and functioning, adults should meet at least 7 hours of sleep every night². Adults need 7 to 9 hours of sleep for optimum output and wellbeing, according to the American Academy of Sleep Medicine, whereas teenagers need more sleep, ideally between 8 and 10 hours³,⁴. From a metabolic point of view, Obesity and diabetes have been attributed to sleep deprivation⁵. Sleep deprivation can lead to excessive food cravings and glucose sensitivity issues, which can lead to impaired glycogen repletion and affect appetite, food intake, and protein synthesis⁶. Growth hormone and cortisol secretion are also impaired by lack of sleep⁷. Sleep period can also be influenced by biological and psychosocial factors, daily activities, and behaviors⁸.

For athletes who work intensely regularly, sleep is crucial for mental and physical recovery⁹. Athletes with insufficient sleep quality and quantity can experience a drop in physical performance (such as sudden strength and endurance), a decrease in cognitive performance (such as attention and memory), and an increased risk of illness or injury.¹⁰. Sleep and mood states have a significant relationship, and both of these aspects have a significant impact on an athlete's athletic success.¹¹. According to study¹², sleep has a clear relationship with mood and athletic performance. The connection between sleep quality, mood, and athletic performance has been proven in recent research.¹³–¹⁵. Coaches and players have long understood the value of sleep in their training, competition, and recovery.¹⁶. Increased sleep duration and quality in athletes are related to improved performance and competition results, according to growing evidence. Sleep is a vital part of the recovery and adaptation process between bouts of exercise.¹⁷. Exercise is thought to lead to better sleep quality and a longer sleep period in general²⁰. Overtraining, on the other hand, is likely to raise arousal levels and disrupt sleep.¹⁸. Overtraining, on the other hand, has been linked to sleep disturbances in athletes and those who exercise early in the morning get less sleep.¹⁹.. Athletes may require more sleep than non-active people to allow for
sufficient recovery and adaptation between bouts of exercise, probably requiring closer to 9 to 10 hours of sleep rather than the 7 to 9 hours recommended for adults. According to Milewski et al., people who slept less than 8 hours per night were more likely to report an accident than those who slept more than 8 hours per night.

Athletes who are sleep deprived may have diminished brain function, which may influence judgment and/or decision-making at any point during their athletic career. Sleep quality is most vulnerable before major sporting events, during times of high-intensity training, and after long travel for competitions, and elite athletes often show compromised sleep measures and quality. Compromised sleep measures and/or quality may be harmful to the outcome of the recovery process after training and competition. Athletes who get less than the recommended amount of sleep a day (less than 8 hours) have been found to have poor athletic results. According to a study on precompetitive sleep behavior in athletes, the majority slept less than 8 hours and recorded poorer sleep quality than average, owing to mood and anxiety disturbances before the competition. Besides, as compared to age and sex-matched test subjects, Olympic athletes had poorer sleep quality in terms of sleep effectiveness and sleep crumbling.

Scope of the Study
In Pakistan, less research work has been done on recovery for athletes during training, which has a great impact on the performance of athletes. This study will help the athletes and coaches to concentrate on this factor and will help them to enhance their performance.

Objective of the Study
- To examine sleep disturbance and its effects on the performance of athletes in Pakistan

Material and Methods
From February to April 2020, a cross-sectional, multi-center study was conducted among different athletes in different cities across Pakistan.

Research Design
A cross-sectional, multi-center study was conducted among different athletes in different cities across Pakistan. Athletes > 18 years of age, of both genders, doing regular training and willing to participate in this research.

The study’s goal was clarified to athletes. Those who wanted to take part in the study offered written informed consent. After that, participants were asked to complete a demographic questionnaire as well as the Urdu version of the Pittsburgh Sleep Quality Index (PSQI).

Sample of the study
The population for this study comprises athletes of different games from across Pakistan. The total number of responses received was 200.

Instruments used
**Baseline demographic questionnaire**
Gender, age, educational status, employment status, city of residence, and game were all collected using this questionnaire.

**Urdu version of (PSQI) Pittsburgh sleeps quality index** The researchers used a validated Urdu version of the Pittsburgh sleep quality index (PSQI) instrument to examine self-reported sleep quality over the previous month. It included “19 products, which were combined with seven component ratings, including subjective sleep quality, sleep latency, sleep length, habitual sleep performance, sleep disturbances, use of sleep medication, and daytime dysfunction.” The total score was calculated by adding the scores from these seven elements, which ranged from 0 to 21. Sleepers with a PSQI score of more than 5 were labeled as bad, whereas those with a score of less than 5 were labeled as good.

Statistical analysis
The Statistical Package for Social Sciences version 21.0 was used to analyze the data (SPSS Inc., Chicago, IL). The number and frequency of categorical variables were presented. The Independent T-test and the ANOVA test were used to look at the relationships between categorical variables. Binary logistic regression was employed to study associations of different characteristics with sleep quality assessed via PSQI. P-value < 0.05 was considered significant.

Results
A total of n=230 athletes were approached out of whom n=205 athletes filled the questionnaire having a response rate of 89.1%. Among n=205 athletes, the majority were males n=186 (90.7%) and n=173
(84.4%) were of the age group of 18-30 years, respectively. Among the athletes, n=78 (38.0%) were master’s degree holders, and most of them n=95 (46.3%) were unemployed. Athletes from different cities of residence and games participated in this study of whom the majority were from Peshawar n=44(21.5%) (Details are shown in table 1).

### Table 1: Demographics of participants n=205

| Statement                      | N   | (%)  |
|--------------------------------|-----|------|
| **Gender**                     |     |      |
| Female                         | 19  | (9.3)|
| Male                           | 186 | (90.7)|
| **Age**                        |     |      |
| 18-30 years                    | 173 | (84.4)|
| 31-40 years                    | 25  | (12.2)|
| 41-50 years                    | 7   | (3.4)|
| **Education status**          |     |      |
| Secondary school               | 21  | (10.2)|
| Higher secondary school        | 45  | (22) |
| Bachelor                       | 61  | (29.8)|
| Master                         | 78  | (38) |
| **Employment status**          |     |      |
| Unemployed                     | 95  | (46.3)|
| Government employee            | 49  | (23.9)|
| Private employee               | 46  | (22.4)|
| Self-employee/Own business     | 15  | (7.3) |
| **City of residence**          |     |      |
| Peshawar                       | 44  | (21.5)|
| Islamabad                      | 34  | (16.6)|
| Mardan                         | 34  | (16.6)|
| Mian Chanu                     | 27  | (13.2)|
| Faisalabad                     | 16  | (7.8)|
| Lahore                         | 15  | (7.3)|
| Multan                         | 10  | (4.9)|
| Swat                           | 8   | (3.9)|
| Karachi                        | 4   | (2) |
| Nowshera                       | 3   | (1.5)|
| Bannu                          | 3   | (1.5)|
| Kohat                          | 2   | (1) |
| Abbottabad                     | 2   | (1) |
| Swabi                          | 1   | (0.5)|
| Sargodha                       | 1   | (0.5)|
| Bahawalpur                     | 1   | (0.5)|
| **Game**                       |     |      |
| Athletics                      | 205 | (100)|

The majority of the athletes, n=88 (42.9 percent), said they slept 6-7 hours, with n=47 (22.9 percent) saying they slept 5-6 hours. In the PSQI components score, the majority of the athletes (n=107 (52.2%)) had mild difficulty with sleep latency, while n=144 (70.25%) had mild difficulty with daytime dysfunction... N=134 (65.4%) of athletes reported having relatively good sleep quality, and n= 202 (98.5%) of our athletes had never used sleep medications. The athletes’ average PSQI
score was 4.50 3.12 with a mean and standard deviation of 3.12. (As shown in table 2). Table 2: Component score of PSQI n=205

| Components of PSQI                  | Responses | N (%) |
|------------------------------------|-----------|-------|
| **Sleep duration**                 |           |       |
| > 7 hours                          |           | 24 (11.7) |
| 6-7 hours                          |           | 88 (42.9) |
| 5-6 hours                          |           | 47 (22.9) |
| < 5 hours                          |           | 46 (22.4) |
| **Sleep disturbances**             |           |       |
| 00                                 |           | 23 (11.2) |
| 01                                 |           | 168 (82) |
| 02                                 |           | 14 (6.8) |
| 03                                 |           | 0 (0) |
| **Sleep latency**                  |           |       |
| 00                                 |           | 24 (11.7) |
| 01                                 |           | 107 (52.2) |
| 02                                 |           | 50 (24.4) |
| 03                                 |           | 24 (11.7) |
| **Dysfunction throughout the day** |           |       |
| 00                                 |           | 49 (23.9) |
| 01                                 |           | 144 (70.2) |
| 2                                  |           | 10 (4.9) |
| 3                                  |           | 2 (1) |
| **Sleep efficiency**               |           |       |
| > 85 %                             |           | 85 (41.5) |
| 75–84 %                            |           | 71 (34.6) |
| 65–74 %                            |           | 33 (16.1) |
| < 65 %                             |           | 16 (7.8) |
| **Sleep quality**                  |           |       |
| Very Good                          |           | 7 (3.4) |
| Fairly Good                        |           | 134 (65.4) |
| Fairly Bad                         |           | 57 (27.8) |
| Very Bad                           |           | 7 (3.4) |
| **Sleep medication**               |           |       |
| Not during the past month          |           | 202 (98.5) |
| Less than once a week              |           | 1 (0.5) |
| Once or twice a week               |           | 1 (0.5) |
| Three or more times a week         |           | 1 (0.5) |
| **Overall PSQI (Mean ± SD)**       | 4.50 ± 3.12 |       |

By doing categorization of athletes on basis of PSQI score for good sleepers and bad sleepers, the results showed that n=84 athletes were bad sleepers. Of whom the majority of the bad sleepers were males n=75 (89.3%), and having age group of 18-30 years n=71 (84.5%). The majority of the athletes having a Master's level of education were bad sleepers and statistically significant while n=43 (51.2%) were unemployed (details are in table 3). A binary logistic regression was performed while taking the PSQI score as dependent and other factors (age, gender, education status, employment status, city of residence, and game) as an independent. There was no statistically significant relationship between any of the variables and the PSQI score, according to the findings.

Table 3: Characteristics of good sleep and bad sleep among participants n=205

| Statement                  | Bad sleepers [PSQI score > 5] (n=84) | Good sleepers [PSQI score < 5] (n=121) | p-value |
|----------------------------|--------------------------------------|----------------------------------------|---------|
| **Gender**                 |                                      |                                        |         |
| Female                     | 9 (10.7)                             | 10 (8.3)                               | 0.431 a |
| Male                       | 75 (89.3)                            | 111 (91.7)                             |         |
| **Age**                    |                                      |                                        |         |
| 18-30 years                | 71 (84.5)                            | 102 (84.3)                             | 0.279 b |
| 31-40 years                | 12 (14.3)                            | 13 (10.7)                              |         |
**Discussion**

This study aimed to learn about the sleep complaints of Pakistani athletes in various cities across the world. The key findings revealed that 52.2 percent of Pakistani athletes had moderate sleep disorders, while 70.25 percent had mild daytime dysfunction. Person and team sports athletes had different perspectives on the impact of insufficient sleep on results. Person and team sport athletes had different estimated probabilities of sleep disruption based on their age.

Increased daytime instability was the most commonly reported result of sleep disruption in our study (70.25 percent). Daytime dysfunction was identified as the most frequently described outcome of insufficient sleep in previous studies of athletes and the general population, and daytime dysfunction was recognized as the most frequently described result of insufficient sleep. Individual sport athletes tend to be similar to team sport athletes in terms of reported sleep issues, although these results vary from those of Erlacher et al. Individual sport athletes reported more poor sleep than team sport athletes, according to the researchers. The lower pressure and anxiety faced in team sports can be explained by the fact that, unlike professional sports athletes, these athletes are not solely liable and accountable for their outcomes.

Although more research is required to fully understand the differences in sleep patterns between individuals and team sports athletes, our current evidence suggests that sleep education through behaviors that are thought to encourage improved sleep quantity and quality can be beneficial for individual and team sports athletes as a result of sleep enhancement.

Because of the many factors that lead to bad sleep, defining normal sleep in athletes and various age groups remains a challenge. Age-related sleep variations have been documented; however, these differences are most noticeable in people over the age of 40, limiting the utility of these data in our athlete population. The exact reason why individual sport athletes are more likely to suffer from sleep disturbance is unknown, and more research is needed.

Although the current study sheds light on an important subject, it has some limitations that should be addressed in future research. The following are some of the study's possible limitations: the study only included a small number of athletes, which could restrict the generalizability of the results. As a result, larger future studies could provide a better understanding of this issue.
Conclusion
Overall, the findings of this study showed that athletes have disturbed sleep quality and interventions should be done to improve sleep quality so that the performance of the athletes can be improved. Furthermore, we found no statistically significant predictors of poor-quality sleep, so larger future studies are needed to gain a better understanding of the problem.

Recommendations
The study findings showed poor sleep quality among athletes, so interventions and further studies should be designed and conducted to improve sleep quality among athletes to enhance their performance.

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All authors read and approved the final version of the manuscript.

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