



Evaluation of Sleep Behaviors in Male Football Players Participating in Youth Football Leagues

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Abstract: This article addresses a research study aimed at evaluating the sleep behaviors of young football players in Turkey. The research was conducted using a correlational survey design. The population consisted of male football players participating in the Turkey Football U 19 Elite A, U 17 Elite A, U 17 Elite B, U 19 Regional Development, U 17 Regional Development, and U 16 Development leagues, with a sample size of 203 players. Statistical methods such as normality analysis, Mann-Whitney U test, and Kruskal-Wallis H test were used for analysis. The study found no statistically significant differences in the variables of football year, position status, training day, regular medication use status, education level, and sleep duration among young football players. The data revealed that young players who stayed with friends at home or alone had higher sleep quality compared to those staying with their families at home. When analyzed according to the computer and phone usage variable, except for the sleep disorder factor, all sub-dimensions favored those using computers and phones. Regarding the playing status in development leagues, significant results were found in the sports factor sub-dimension for U 19 Elite A and U 19 Regional Development league players in relation to sleep quality factors. According to ASBQ Total Score averages, the values of U 19 Elite A league players were more significant compared to U 17 Elite A league players and U 16 Development league players. Regarding the sleep problem status variable, players indicating sleep problems had statistically higher values in sleep quality factors, Habitual sleep efficiency factors, and ASBQ Total Scores. In conclusion, it can be stated that there is a direct relationship between sleep and performance among U 19 Elite A young football players, and they act with this awareness.

Keywords: Football, Sleep, Behavior, Young Athletes

1. Introduction

Sleep consists of two distinct phases that alternate throughout the night, each composed of five different stages. These phases are referred to as the "Slow Wave Sleep Phase - NONREM" and the "Rapid Eye Movement Sleep Phase - REM" (Black, 2003). Sleep duration varies throughout the life cycle. For promising adolescent athletes, an 8-10 hour sleep requirement is recommended. This sleep consists of approximately 57% light sleep, 22% deep sleep, and 21% REM sleep (Ohayon et al., 2004). The sleep process begins with NONREM stages and continues with REM sleep. These steps take place in a specific sequence and order (Aserinsky & Kleitman, 1953).

The relationship between sleep and exercise has a significant impact on human health and well-

being. Sleep quality and duration are directly related to physical performance and fitness levels (Youngstedt *et al.*, 2019; Kline *et al.*, 2011; Chennaoui *et al.*, 2015). Many studies show that exercise improves sleep quality and is a protective factor against sleep deprivation. For example, people who exercise regularly tend to have better sleep duration and quality (Rana *et al.*, 2019). Additionally, high-intensity interval exercise has been shown to improve both sleep quality and duration (Kline *et al.*, 2012).

Research on sleep and exercise has increased in recent years. For example, one study found that exercise improved sleep quality and reduced insomnia (Johnson *et al.*, 2022). Additionally, maintaining a regular sleep schedule has been shown to improve physical performance and reduce fatigue (Smith *et al.*, 2022). However, information about the effects of

exercise in people with sleep disorders is limited. Results can be conflicting and in such cases, people with sleep disorders should consult their doctor before starting an exercise routine (Chen *et al.*, 2022). Additionally, the relationship between sleep and exercise may vary between individuals (Gupta & Shrivastava, 2022). It has been reported that sleep quality or sleep disorders are highly prevalent in elite athletes (50-78%), with 22-26% complaining of high levels of sleep deprivation (Gupta *et al.*, 2017; Samuels, 2008; Swinbourne *et al.*, 2016).

The relationship between sports and sleep significantly impacts athletes' performance and overall health. Numerous studies show that adequate sleep enhances sports performance (Lastella *et al.*, 2015; Milewski *et al.*, 2014). Sleep promotes muscle recovery, replenishes energy resources, and improves critical skills such as mental focus, reflex speed, and reaction times in athletes (Halson, 2014; Samuels, 2018). Conversely, sleep deprivation or poor sleep quality can negatively affect athletes' performance and increase the risk of injury (Simpson *et al.*, 2017; Vitale *et al.*, 2019). Therefore, athletes need to pay attention to their sleep patterns and ensure they get sufficient and quality sleep. Maintaining good sleep hygiene, optimizing sleep habits, and providing appropriate sleep environments are crucial for enhancing performance and health (Lastella *et al.*, 2015; Milewski *et al.*, 2014; Samuels, 2018).

Sleep behavior is one of the most important off-field strategies for athletes (Costa *et al.*, 2023). This is an area of increasing interest and important research. Key topics covered include the impact of fatigue during training and competition, travel, sleep-wake cycles, sleep environment, hotel check-in times, roommates, activities before sleep such as watching television (Coel *et al.*, 2023) or using social media, flight time and duration, and dietary habits including caffeine consumption (Clark & Landolt, 2017; Landolt, 2015). These factors contribute to the increased prevalence of sleep disorders in athletes (Gupta *et al.*, 2017).

It has been observed that sleep quality improves the anaerobic performance of youth soccer players (Souissi *et al.*, 2019). The irregular schedules, travel, and injuries and stress experienced by soccer players can affect their sleep patterns, which can negatively impact their performance (Kostyun *et al.*, 2015). Therefore, the importance of sleep regulation to improve soccer performance is emphasized (Simpson *et al.*, 2021).

This study represents an important step in understanding the sleep behavior of young soccer players and the relationship between sleep and soccer performance. The results can guide soccer players to optimize their sleep schedules and adopt appropriate sleep habits to improve their performance.

2. Materials and Methods

2.1 Research Design

In this study to evaluate the sleep behavior of young football players in Turkish football leagues, a quantitative research method was used based on the "correlational survey" model. A correlational survey design is a type of research conducted to reveal the relationship between two or more variables without any attempt to manipulate or influence them (Büyüköztürk *et al.*, 2010).

2.2 Population and Sample of the Research

The study population included male soccer players competing in the U 19 Elite A, U 17 Elite A, U 17 Elite B, U 19 Regional Development, U 17 Regional Development and U 16 Development tournaments. in Turkey. The sample included 203 youth soccer players who volunteered to participate in the study. The study used correlation sampling method which is a probability sampling method to select the sample.

2.3 Research Data Collection Tools

The survey used in the study was divided into two parts. The first part was the "Personal Information Form" which was intended to collect personal information of the participants. The second part consisted of the "Athlete Sleep Behavior Survey (ASBS-TR)", which consisted of 17 questions designed to study the sleep behavior of male soccer players in different soccer leagues. Before the start of the study, the necessary procedures were followed to ensure compliance with ethical standards and ethical approval was obtained from the Chairman of the Ethics Committee of Çanakkale Onsekiz Mart University.

"Personal information form" includes 4 items prepared by the researcher to identify personal information of individuals participating in the study. The purpose of these questions is to collect information about age, education level, playing position, number of years competing, number of training days, location of residence, use of sleeping pills, and computer use. or

phone before bed, play league, sleep. duration and presence of sleep problems.

The "Athlete Sleep Behavior Survey (ASBS-TR)" was administered along with information forms to assess participants' general sleeping habits. Developed by Driller *et al.* (2018), compared with wrist heart rate measurement, sleep hygiene index, Epworth sleepiness scale, and Pittsburgh sleep quality index, ASBS-TR is a newly developed questionnaire with higher accuracy. Reliability and validity have been established for assessing overall sleep in athletes. The Turkish version of ASBS was developed by Darendeli *et al.* (2019). This 17-item survey is a reliable and validated tool for identifying sleep difficulties in athletes. A sleep quality classification questionnaire score of 34 indicates good sleep and ≥ 40 indicates poor sleep.

2.4 Data Collection

The data and information collection method used in the research was an online survey method conducted via Google Forms. To publish this online survey method, an account was created on the mentioned website, and an online survey link was prepared. This survey link was distributed to participants via email and social media groups from April 10th to April 30th, 2023, requesting participants to fill out the survey form online.

2.5 Statistical Analysis

The normality analyses of the data were conducted using the Kolmogorov-Smirnov test since the number of volunteers participating in the research was greater than 50. For the analysis of binary variables, the Mann-Whitney U test was used, while the Kruskal-Wallis H test was used for more than two variables. To determine the source of the obtained difference, the Tamhane's T2 post hoc test was used. All statistical analyses were performed using IBM Statistics (SPSS,

version 25.0, Armony, NY) software package. The data were expressed as mean \pm standard deviation ($\bar{x} \pm sd$), and a significance level of $p < 0.05$ was considered.

3. Results

According to the findings of the study, statistically significant differences were not found in variables such as football years, playing position, training days, regular medication usage, educational status, and sleep duration.

The data analysis revealed that athletes who stayed at home with friends or alone had higher sleep quality compared to athletes staying with their families. Additionally, their total scores were statistically higher than those of athletes staying in sports facilities.

When analyzed based on the variable of computer and phone usage, it was found that in all sub-dimensions except for sleep disorder factor, individuals who used computers and phones had an advantage.

Based on the variable of playing in development leagues, significant results were found in the sports factor sub-dimension between U-19 Elite A and U-19 Regional Development league players compared to U-17 Elite A league players. In terms of sleep quality factors, significant results were found between U-17 Elite B league players and U-19 Elite A league players based on the values of U 19 Elite A league players. Moreover, concerning the ASBQ Total Score averages, U-19 Elite A league players' values were significantly higher compared to U-17 Elite A league players and U-16 Development league players.

According to the variable of sleep problem status, athletes indicating the presence of sleep problems had significantly higher values in terms of Sleep Quality Factors, Habitual Sleep Efficiency Factors, and ASBQ Total Scores.

Table 1. Residence status variable

	Residence Status	N	Mean	Std. Deviation	Kruskal-Wallis H	p	Difference
Sport factor	At home with family	179	11,45	2,95	8,751	,013	2>1
	Friends at home or alone	9	14,11	2,31			
	At the facility	15	12,06	2,25			

	Total	203	11,62	2,92			
Sleep quality factors	At home with family	179	10,71	2,49	6,511	,039	2>1
	Friends at home or alone	9	12,88	1,83			
	At the facility	14	11,14	2,17			
	Total	203	10,84	2,48			
Habitual sleep efficiency factors	At home with family	179	6,44	1,51	5,237	,073	
	Friends at home or alone	9	6,33	1,41			
	At the facility	15	5,60	1,05			
	Total	203	6,37	1,49			
Sleep disorder factors	At home with family	179	3,16	,51	1,016	,602	
	Friends at home or alone	9	3,11	,33			
	At the facility	15	3,26	,59			
	Total	203	3,16	,50			
ASBQ Total Score	At home with family	179	31,77	5,39	7,851	,020	2>1 2>3
	Friends at home or alone	9	36,44	3,35			
	At the facility	14	31,92	3,95			
	Total	203	31,99	5,30			

1: At home with family; 2: Friends at home or alone; 3: At the facility

Table 2. Variable of computer and phone usage status

	Computer and Phone Usage	N	Mean	SD	Mann-Whitney U	P
Sport factor	Yes	9	12,26	2,91	3649,00	,000
	No	194	11,00	2,80		
Sleep quality factors	Yes	9	11,66	2,22	3186,00	,000
	No	194	10,06	2,46		
Habitual sleep efficiency factors	Yes	9	6,70	1,53	4046,50	,007
	No	194	6,05	1,38		
Sleep disorder factors	Yes	9	3,20	,55	4912,00	,314
	No	194	3,13	,46		
ASBQ Total Score	Yes	9	33,82	5,15	3054,50	,000
	No	194	30,26	4,88		

Table-3. Variable of playing in the development league

	League Status	N	Mean	SD	Kruskal-Wallis H	p	Difference
Sport factor	U-19 Elite A	30	12,50	2,82	15,82	,003	1>2 4>2
	U-17 Elite A	13	9,15	2,23			
	U-17 Elite B	19	10,78	2,93			
	U-19 Regional Development	51	12,13	2,83			
	U-17 Regional Development	30	11,76	3,19			
	U-16 Regional Development	60	11,46	2,77			
	Total	203	11,62	2,92			
Sleep quality factors	U-19 Elite A	29	12,44	2,14	13,583	,009	1>3
	U-17 Elite A	13	10,46	2,33			
	U-17 Elite B	19	9,94	2,24			
	U-19 Regional Development	51	11,19	2,52			
	U-17 Regional Development	30	10,96	2,38			
	U-16 Regional Development	60	10,06	2,37			
	Total	202	10,84	2,48			
Habitual sleep efficiency factors	U-19 Elite A	30	6,50	1,10	2,913	,572	-
	U-17 Elite A	13	6,00	1,73			
	U-17 Elite B	19	6,63	1,70			
	U-19 Regional Development	51	6,41	1,53			
	U-17 Regional Development	30	6,63	1,35			
	U-16 Regional Development	60	6,15	1,57			
	Total	203	6,37	1,49			
Sleep disorder factors	U-19 Elite A	30	3,20	,55	,720	,949	-
	U-17 Elite A	13	3,07	,27			
	U-17 Elite B	19	3,21	,53			
	U-19 Regional Development	51	3,21	,61			
	U-17 Regional Development	30	3,26	,69			
	U-16 Regional Development	60	3,06	,25			
	Total	203	3,16	,50			
ASBQ Total Score	U-19 Elite A	29	34,62	3,96	12,851	,012	1>2,6
	U-17 Elite A	13	28,69	4,88			
	U-17 Elite B	19	30,57	5,87			

	U-19 Regional Development	51	32,96	5,52			
	U-17 Regional Development	30	32,63	5,47			
	U-16 Regional Development	60	30,75	4,85			
	Total	202	31,99	5,30			

1: U-19 Elite A; 2: U-17 Elite A; 3: U-17 Elite B; 4: U-19 Regional Development; 5: U-17 Regional Development; 6: U-16 Regional Development

Table 4. Sleep disorder variable

	Sleep Disorder	N	Mean	SD	Mann-Whitney U	p
Sport factor	Yes	32	12,50	3,10	2280,50	,133
	No	171	11,45	2,87		
Sleep quality factors	Yes	32	11,80	2,30	2004,50	,030
	No	171	10,66	2,47		
Habitual sleep efficiency factors	Yes	32	7,25	1,81	1806,00	,002
	No	171	6,21	1,36		
Sleep disorder factors	Yes	32	3,21	,55	2610,50	,463
	No	171	3,15	,50		
ASBQ Total Score	Yes	32	34,77	5,15	1799,50	,004
	No	171	31,49	5,19		

4. Discussion

The aim of this study was to examine the sleep behaviors of young football players competing in the U 19 Elite A, U 17 Elite A, U 17 Elite B, U 19 Regional Development, U 17 Regional Development, and U 16 Regional Development leagues in Turkey.

According to the study findings, there was no statistical difference in variables such as football years, playing position, training days, regular medication usage, educational status, and sleep duration ($p > 0.05$). In a study by Karabulut (2022) evaluating the sleep behaviors of male football players in different football leagues, it was found that participants in the Misli.com 3rd League group had higher sleep behavior scores compared to participants in the Regional Amateur League. This situation is thought to be due to the increase in goals with professionalism, considering football as a job, and focusing solely on football.

When examining the data related to the variable of living situation, it was found that individuals who lived alone or with friends had statistically higher

total scores in the sports factor, sleep quality, and overall scores compared to those living with their families and those staying in team facilities (Table 1). This situation should be evaluated as indicative of individuals who are self-reliant, responsible, and capable of directing their own lives.

The data analysis based on the variable of computer and phone usage revealed a statistical advantage for those who answered "yes, I use them" in all sub-dimensions except for the sleep disorder factor (Table 2). However, it's important to note that the number of users in this group was 9, while the number of non-users was 194 athletes. We can infer that these 9 individuals use computers and phones consciously.

In related literature, Sülün *et al.* (2021) highlighted that adolescents had a high risk of smartphone addiction during the COVID-19 pandemic, and smartphone addiction affected daytime sleepiness and sleep quality. Başkan *et al.* (2023) examined the relationship between smartphone addiction, physical activity, fatigue, and sleep quality in university students,

finding that the increasing prevalence of smartphone addiction in recent years has led to higher levels of fatigue among students. This situation is crucial for athletes, emphasizing the importance of conscious smartphone and computer usage. It calls for increased awareness and sensitivity towards responsible usage of these devices.

When analyzed based on the variable of playing in development leagues, it was found that older athletes (those playing in the U 19 Elite A and U 19 Regional Development leagues) had higher scores in the sports factor, sleep quality factors, and total scores compared to younger athletes (Table 3). Ceylan and Akay (2022) found a significant difference in the "sport-related" sub-dimensions of sleep behaviors when comparing national athletes based on their national ranking. As the national ranking increased, athletes' sleep behavior levels were negatively affected. Recent studies indicate that athletes experience sleep disorders (Bender *et al.*, 2018; Mah *et al.*, 2018; Walsh *et al.*, 2021). Various research has shown that acute exercise and moderate-intensity exercise have a positive effect on sleep (Taylor *et al.*, 1997; Youngstedt *et al.*, 1997). Elite athletes with intense training and competition schedules limiting their sleep opportunities report experiencing sleep problems (Walsh *et al.*, 2021). This situation could be attributed to the older athletes in the U 19 Elite A and U 19 Regional Development leagues having more intense physical training and competition schedules compared to younger athletes, leading to increased awareness of their sleep behavior levels.

According to the sleep problem status variable, athletes who reported having sleep problems had statistically higher values in terms of sleep quality factors, habitual sleep efficiency factors, and ASBQ total scores (Table 4). Relevant studies have identified the risk of sleep impacting performance development in athletes (Fullagar *et al.*, 2014). Additionally, regular sleep enhances recovery quality (Özen & Civil, 2020). The sleep health of professional athletes is a significant trend in preventing physical injuries (Cook *et al.*, 2023). Poor sleep not only affects physical development in professional athletes but also impacts performance components (Bonnar *et al.*, 2018; Kirschen *et al.*, 2018). It has been found that reduced reaction time due to decreased sleep regulation affects competition performance (Bonnar *et al.*, 2018). This suggests a connection between the athletes in the study and the relationship between sleep and athletic performance, aligning with findings in the literature.

5. Conclusion

It can be said that the young football players participating in this study are aware of the direct relationship between sleep and performance, especially among older athletes. It can also be noted that U 19 Elite A players exhibit sleep behaviors in line with professional conduct. Furthermore, it can be suggested that young athletes should be educated on the importance of sleep. This education should cover topics such as the amount and timing of nighttime sleep, daytime napping, good sleep hygiene, treatment methods for sleep disorders, and the relationship between sleep and nutrition. It is also recommended that travel schedules for away games be planned according to sleep times.

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Author Contribution Statement

Omer İlker Sahin: Conceptualization, Investigation, Writing original draft. **Mahmut Acak:** Conceptualization, Methodology, Validation, Data curation, Writing original draft. **Hakan Buyukcelebi:** Conceptualization, Supervision, Review and editing. All the authors read and approved the final version of the manuscript.

Ethics Approval Statement

This study was approved by the Institutional Research Ethics Committee.

Conflict of Interest

The authors declare that there was no conflict of interest.

Does this article pass screening for similarity?

Yes

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