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Beyond the Court: The Connection Between Sleep Patterns and Nutrition in Adolescent Basketball Athletes

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ABSTRACT

The aim of this study is to evaluate the relationship between sleep quality and nutritional habits of adolescent basketball players. The study was conducted with 86 basketball athletes aged 12-18 years in 3 private sports clubs. A 4-step questionnaire was administered to the participants. The Pittsburgh Sleep Quality Index was used to assess sleep quality levels, and the International Physical Activity Questionnaire (short form) was used to evaluate physical activity levels. A 24-hour dietary recall was used to assess nutritional status. As a result of this study, it was observed that basketball players with good sleep quality believed they had adequate and balanced nutrition, and individuals with good sleep quality consumed only one snack per day. This finding was statistically significant ($p < 0.05$). There is a statistically significant difference in body weight among participants based on their sleep quality. Body weight appeared to be higher in participants with poor sleep quality ($p<0.05$). There is no significant correlation found between Pittsburgh Sleep Quality Index and International Physical Activity Questionnaire scores, sport club membership, nutritional knowledge, implementation status of the nutrition programme, the person who recommended the programme, the number of meals, and skipping meals status ($p > 0.05$).

INTRODUCTION

Healthy eating throughout life is a crucial factor in preventing non-communicable diseases, as well as in preventing malnutrition and its associated problems (WHO, 2018).

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Adolescence is one of the most exciting and challenging periods in a human being's development. The age range between 12 and 21 is generally considered to be adolescence. However, it is also a period of physiological, psychological, and cognitive development as a child transition into a young adult (Larson et al., 2017). Physical activity plays a crucial role in growth and development. It also has a positive impact on adolescent health (Li et al., 2024). For adolescents to be successful in sport, nutrition is even more important (Capra et al., 2024).

Depending on the type, intensity and duration of the sport, as well as physical characteristics, sports nutrition varies. They require more energy and nutrients than people with a sedentary lifestyle (Martín-Rodríguez et al., 2024). Basketball players require sufficient nutritional information and a sustainable nutritional model to achieve success (Escribano-Ott et al., 2022).

Basketball is played with a special ball. There are two teams, each with five active players and a maximum of seven substitutes. Both teams have their basket. The basket consists of a hoop attached to a plane called a backboard of a certain height and dimensions, and a net attached to this hoop that is open on both sides. The two teams aim to pass the ball through the hoop of the opposing team and to prevent the ball from being passed through the hoop of their own team. Many of the measurements, such as dribbling, attack time, and points scored, are professionally set by the International Basketball Federation. Referees oversee the monitoring and recording of the application of the rules, time, and points during the game (Turkish Basketball Federation, 2017).

Sleep is a period of rest for both the body and mind. During sleep, consciousness and decision-making processes are temporarily reduced, and bodily functions slow down. Physiological changes such as heart rate, blood pressure and breathing occur (Sajjadieh et al., 2020). Sleep is necessary to sustain life. Therefore, sleep restriction alters the activity of the sympathetic nervous system, disrupts glucose tolerance and changes hormone levels (Hirotsu et al., 2015; Rogers et al., 2024). Sleep quality refers to an individual's perception of being alert, fit, and ready for a new day after waking up. The quality of sleep encompasses both subjective characteristics, such as depth and restfulness, and measurable characteristics, including sleep latency, total sleep time, and the number of times one wakes up during the night (Nelson et al., 2022).

Recently, the risk of obesity has been linked to sleep duration and quality (Keremat et al., 2023). Sleep time is significantly reduced with the hustle and bustle of modern life (Chaput et al., 2020). Recent studies have shown that sleep also affects physical activity levels, as well as food consumption, just as sleep quality and duration influence food consumption and

weight gain (Öçal, 2015; Min et al., 2018; Soltanieh et al., 2021). At this point, sleep may likely have an indirect effect on the nutrition patterns of adolescent basketball players. For all these reasons, the aim of this study was to evaluate the relationship between sleep quality and food consumption behaviours, dietary intake, and body weight in adolescent basketball athletes. In addition, this study aims to contribute to the limited literature on the interplay between sleep and nutrition in adolescent athletes, a group with unique physiological and psychological needs. Understanding these relationships can help coaches, dietitians, and parents support young athletes with evidence-based strategies that promote both athletic performance and overall health. Moreover, the findings may serve as a reference point for developing targeted interventions to improve lifestyle habits in this population.

METHODS

Participants

This research was conducted between January 2022 and April 2022 among adolescent athletes aged 12-18 who participated in the basketball departments of Cevizli Atak Youth and Sports Club, Göztepe Academy Sports Club, and Z10 Sports Club. The study excluded participants who used sleeping pills. Voluntary individuals within the specified age range, who were not excluded by the criteria, were included in the study. Within the specified period, 86 adolescent basketball players volunteered to participate in the study.

This study was conducted in accordance with the principles of the Declaration of Helsinki. Ethics committee permission was obtained from Istanbul Gedik University Non-Interventional Clinical Research Ethics Committee (Decision No: 2022/1- Date: 11/01/2022). Institutional permissions from Cevizli Atak Youth and Sports Club, Göztepe Academy Sports Club, and Z10 Sports Club were obtained prior to the research. Each participant and their parents read and signed an informed consent form at the beginning of the study.

Procedures

This is a cross-sectional study of 86 basketball players between the ages of 12 and 18 from Cevizli Atak Youth and Sports Club, Göztepe Akademi Sports Club, and Z10 Sports Club. A 4-step questionnaire (comprising socio-demographic information, the Pittsburgh Sleep Quality Index, the Physical Activity Questionnaire-short form, and a 24-hour dietary recall) was administered to the participants.

In the first stage of the research, a socio-demographic information form was used. This included gender, age, height, body weight, body mass index and general information about the individual's diet. BMI values were assessed according to age and sex using WHO

percentile curves and classified as normal between the 5th and 85th percentile, overweight between the 85th and 95th percentile and obese ≥95th percentile (WHO). BMI percentile calculations were conducted using the WHO AnthroPlus software. In the second stage, the Pittsburgh Sleep Quality Index was used to assess sleep quality. The validity and reliability of this 24-question index was determined by Ağargün et al. (1996). Finally, the 7-question International Physical Activity Questionnaire (short form) developed by Öztürk et al. was used to assess individuals' physical activity levels. Metabolic Equivalents (METs) are cused to express the intensity of physical activity. Physical activity levels are classified as follows: individuals with less than 600 MET-minutes per week are considered inactive, those with 600 to 3000 MET-minutes per week are classified as minimally active, and those with more than 3000 MET-minutes per week are considered very active.

Additionally, to determine the nutritional status of the participants, a 24-hour dietary recall was conducted. They were asked to report the foods and beverages they consumed for breakfast, lunch, dinner, and snacks, and to report their quantities using household measures such as pieces, spoons, ladles, or cups, as no training was provided prior to the study. For this purpose, a photo catalogue of foods and nutritional values was used (Rakıcıoğlu et al., 2015). The Nutrition Information System (BeBiS) 8.2 program was used to evaluate the ingested nutrients.

Data Analysis

SPSS (Statistical Package for Social Sciences) for Windows 25.0 was used to analyse the data obtained in the study. An independent samples t-test was used to compare two groups, while one-way analysis of variance was used to compare more than two groups. The Bonferroni pairwise comparison test was used to determine which group caused the difference, and to compare quantitative data that met the assumption of normal distribution. For comparison of quantitative data that did not meet the assumption of normal distribution, the Mann-Whitney U test for independent samples was used to compare two groups. The Kruskal-Wallis H test was used to compare more than two groups, and the corrected Bonferroni pairwise comparison test was used to determine which group was responsible for the difference. To determine the relationship between categorical variables, chi-squared analysis was used. The level of significance was accepted as being 95% (Büyüköztürk, 2018).

RESULTS

The descriptive statistics relating to the general knowledge of the participants are presented in Table 1. When the age distribution of the participants is examined, it is between

12-18 years, and the average is 13.34±1.48. When the gender distribution is examined, 68.6% are male and 31.4% are female. Of the population analyzed, 22.1% were classified as underweight, 60.5% as having a normal weight, 16.3% as overweight, and 1.2% as obese.

Table 1.
General Characteristic of Participants

	n	**Mean+SD**
How many months have you been playing basketball? (min-max / mean±SD)	1-108	40.83±29.183
Age (min-max / mean±SD)	12-18	13.34±1.48
Gender	**n**	%
Male	59	68.6
Female	27	31.4
BMI (WHO Percentile Range)		
Underweight (< 5th percentile)	19	22.1
Normal weight (5th–85th percentile)	52	60.5
Overweight (85th–95th percentile)	14	16.3
Obese (≥ 95th percentile)	1	1.2
Club Name		
Cevizli Atak Sports Club	43	50.0
Göztepe Akademi Sports Club	11	12.8
Z10 Sports Club	32	37.2
Have you played basketball anywhere else other than your club?		
No	41	47.7
School Team	30	34.9
National Team	1	1.2
Other	14	16.3
Are you interested in any other sports?		
No	48	55.8
Yes	38	44.2
Have you ever received information or training on sports nutrition?		
No	69	80.2
Yes	17	19.8
Do you follow a special nutrition program?		
No	56	65.1
Yes	30	34.9
If the answer is yes. who prepared the nutrition program to you?		
Self-prepared	8	9.3
Friend	2	2.3
Antrenor	4	4.7
Dietitian/Nutritionist	4	4.7
Others	7	8.1
Total	86	100.0

SD: standard deviation; **Min-max:** minimum – maximum; **n:** number; **%:** percentage

The distribution of sleep quality indicates that 62.8% of individuals have good sleep quality, while 37.2% have poor sleep quality. When the physical activity status of the

participants is investigated, it can be seen that 8.1 % are inactive, 41.9 % are minimally active and 50 % are very active (Table 2).

In Table 3, the participants' sleep quality and dietary habits are examined. There is no statistically significant relationship between their answers to the statement, the number of meals eaten per day, the number of main meals eaten per day, whether they skip meals, the meals skipped, and the reasons for skipping meals ($p > 0.05$). When participants said: "I believe that I have an adequate and balanced diet.", there is a statistically significant relationship between their answer and sleep quality ($p<0.05$). 55.6% of participants with good sleep quality said, "I believe that I have an adequate and balanced diet.".

Table 2.
Participants' Pittsburgh Sleep Quality Score and International Physical Activity Score Distributions

	n	%
Pittsburgh Sleep Quality		
Good Sleep Quality: 0-4 points	54	62.8
Poor Sleep Quality: 5-21 points	32	37.2
Physical Activity Questionnaire (Short Form)		
<600 MET-min/week: Inactive	7	8.1
600-3000 MET-min/week: Minimal Active	36	41.9
>3000 MET-min/week: Very Active	43	50.0
Total	86	100.0

n: number; **%:** percentage; **MET:** metabolic equivalents.; **Min:** minutes

A statistically significant relationship exists between the participants' sleep quality and the number of snacks consumed per day ($p < 0.05$). It has been observed that people who consume 1 snack a day have significantly higher sleep quality.

There is a statistically significant difference in body weight among participants based on the quality of their sleep ($p < 0.05$). Participants with poor sleep quality appeared to have higher body weight (Table 4). There is no statistically significant difference in body weight between participants based on their physical activity status ($p > 0.05$).

Table 3.
Relationship between Participants' Nutritional Knowledge and Pittsburgh Sleep Quality Score

	Pittsburgh Sleep Quality				$p <$
	Good Sleep Quality		Poor Sleep Quality		
	n	%	**n**	%	
I pay attention to my nutrition.					
No	7	13,0	2	6.3	0.597
Sometimes	28	51.9	17	53.1	
Yes	19	35.2	13	40.6	
I believe that I have an adequate and balanced diet.					
No	6	11.1	9	28.1	0.045*
Sometimes	18	33.3	13	40.6	
Yes	30	55.6	10	31.3	
How many meals do you usually eat in a day?					
2	3	5.6	4	12.5	0.643
3	22	40.7	13	40.6	
4	18	33.3	8	25.0	
5 and more	11	20.4	7	21.9	
How many main meals do you eat a day?					
1	2	3.7	0	0.0	0.526
2	18	33.3	12	37.5	
3	34	63.0	20	62.5	
What is your daily number of snacks?					
0	8	14.8	12	37.5	0.016*
1	24	44.4	8	25.0	
2	22	40.7	10	31.3	
3 and more	0	0.0	2	6.3	
Do you skip meals?					
No	27	50.0	11	34.4	0.158
Yes	27	50.0	21	65.6	
If you skip meals, which meal do you usually skip?					
Breakfast	7	25.9	8	38.1	0.635
Lunch	10	37.0	8	38.1	
Dinner	1	3.7	0	0.0	
Snacks	9	33.3	5	23.8	
What is your reason for skipping meals?					
I can't find the time	3	11.1	4	19.0	0.263
I don't feel like it/I have no appetite	15	55.6	8	38.1	
I have no habit	5	18.5	3	14.3	
Due to courses, sports etc. activities	0	0.0	3	14.3	
Other	4	14.8	3	14,3	

p: independent-samples t-test; ***:** statistically significant; **n:** number; **%:** percentage

There is no statistically significant difference in the participants' energy, macronutrient, and micronutrient intake values according to their Pittsburgh sleep quality (p>0.05) (Table 5)

Table 4.
Comparison of Participants' Body Weights According to Pittsburgh Sleep Quality Score and International Physical Activity Score Categories

	Body Weight		*p* <
	Mean±SD	Min-Max	
Pittsburgh Sleep Quality			
Good Sleep Quality: 0-4 points	52.83±12.28	34.00-82.25	0.001*
Poor Sleep Quality: 5-21 points	63.45±15.87	39.70-111.00	
Physical Activity Questionnaire (Short Form) Score			
<600 MET-min/week: Inactive	59.71±7.67	50.00-69.00	0.270
600-3000 MET-min/week: Minimal Active	53.79±14.73	34.00-93.00	
>3000 MET-min/week: Very Active	58.81±15.08	38.60-111.00	

p: independent-samples t-test; ***:** statistically significant; **SD:** standard deviation; **Min-Max:** minimum-maximum; **MET:** metabolic equivalents; min: minutes

Table 5.
Comparison of Energy, Macronutrient, and Micronutrient Intakes According to Pittsburgh Sleep Quality Score

	Pittsburgh Sleep Quality				*p* <
	Good Sleep Quality		Poor Sleep Quality		
	Mean±SD	Min-Max	Mean±SD	Min-Max	
Energy (kcal)	2081.4±1872.5	712.1-14671	1855.1±602.0	807.5-3512	0.684
Carbohdyrate (%)	48±8.18	28-64	48.6±6.2	36-61	0.833
Carbohdyrate (g)	213.6±83.1	74.7-425.2	247.7±175.3	102.5-1140.3	0.296
Fat (%)	32.8±7.0	18-50	33.6±6.2	24-50	0.607
Fat (g)	68.3±31.8	20.3-158.2	70.9±30.9	26.7-159.7	0.561
Protein (%)	19.1±3.7	12-30	17.6±2.3	13-22	0.050
Protein (g)	84.7±34.0	31.8-206.8	79.9±27.2	33.2-140.9	0.837
Water (L)	2478.7±1155.4	599.5-4858.2	2405.4±1278.3	706.4-5294	0.778
Fiber (g)	24.2±12.4	6-64.3	24.7±10.9	6.5-48.4	0.734
Poly-unsaturated fatty acids (g)	11.5±6.8	1.4-36.3	12.8±6.2	4.9-27.1	0.251
Polyunsaturated fatty acids (g)	24.0±11.9	6.3-55.3	25.7±13.7	8.7-61.1	0.552
Saturated fat (g)	26.7±13.8	10.4-75.1	26.4±12.2	10.6-69.3	0.717
Cholesterol (mg)	402.7±207.6	46.4-1128.3	363.7±187.6	53-884.8	0.424
Vitamin A (µg)	1036.1±500.4	294.8-2422.6	1098.5±485.4	324.8-2173	0.450
Vitamin D (µg)	6.0±6.3	0.5-36.7	7.3±8.3	0.5-36.8	0.411
Vitamin E (mg)	11.9±6.2	4.2-30	14.1±7.3	3.9-28	0.155
Vitamin K (µg)	112.1±120.7	13.6-720.8	164.9±163.9	18.8-666.6	0.071
Vitamin C (mg)	161.5±112.3	8.7-507.1	224.4±181.3	22.5-1009.9	0.055
Vitamin B1 (mg)	1.2±0.5	0.4-3.1	1.2±0.4	0.4-2.1	0.872
Vitamin B2 (mg)	1.9±0.6	0.7-3.8	1.8±0.6	0.7-3.4	0.792
Vitamin B3 (mg)	30.3±14.2	10.1-78.3	29.5±11.8	10.9-59.1	0.947
Vitamin B12 (mg)	5.6±2.8	2.1-18.2	5.2±2.1	1.8-11.4	0.639
Sodium (mg)	4125.6±1357.5	1579.8-7489.4	4141.6±1786.0	1432.8-8855.2	0.939
Potassium (mg)	2928.8±1164.9	881-5633.2	3061.3±1237.7	1102.7-6261.8	0.765
Calcium (mg)	1127.2±429.9	412.4-2953.2	1085.9±343.7	601.4-2247.4	0.796
Magnesium (mg)	325.4±133.05	111.4-773.5	330.7±125.2	111.3-708.9	0.658
Phosphorus (mg)	1376.8±491.9	620-2870.8	1312.8±439.6	638.5-2332.1	0.744
Iron (mg)	11.8±4.7	3.9-27.4	11.5±4.4	4.5-23.7	0.802
Zinc (mg)	12.3±5.5	3.8-32.6	11.4±4.7	4.7-26.1	0.555

p: independent-samples t-test; ***:** statistically significant; **SD:** standard deviation; **Min-Max:** minimum-maximum; **min:** minutes; **kcal:** kilocalorie; **%:** percentage; **g:** gram; **L:** liter; **mg:** milligram; **µg:** microgram

DISCUSSION

This study was carried out on 86 adolescent basketball players between the ages of 12 and 18 who did not use sleeping tablets, who were members of 3 private sports clubs, and who voluntarily agreed to participate in the study. The aim of the study was to evaluate the relationship between sleep quality and dietary habits, body weight, and physical activity level.

Research based on basketball players is important for the prevention, detection and management of problems related to basketball. As a result of the literature search, to the best of our knowledge, no studies have been found that examine the relationship between sleep quality and nutritional habits in adolescent basketball players.

A study conducted by İnce and others found that 78.4% of professional basketball players were concerned about their diet, while 19.6% were occasionally concerned about it. While 64.7% believed they had an adequate diet, 86.3% believed they had adequate knowledge of sports nutrition. It was also stated that the sources of nutritional information for professional basketball players were 34.1% from nutritionists, 18.2% from nutrition books, and 15.9% from coaches (İnce, 2017). According to Sivrikaya, 76.6% of the athletes reported that their coach was their primary source of nutrition information (Sivrikaya, 2006). As a result of this study, it was observed that individuals who applied a nutrition programme mostly applied the programme they prepared themselves. Considering that the sample of the population in İnce and Sivrikaya's study consisted of adults, it is estimated that the difference in the result is related to this.

In the study conducted by Pulur and Cicioğlu, it was found that a large number of athletes, 54%, were knowledgeable about sports nutrition (Pulur & Cicioğlu, 2001). In Seifert et al's study, 73.7% of athletes reported having good or very good knowledge of nutrition, and 26.2% reported having low and moderate knowledge of nutrition (Seifert et al., 2006). In the study, it was observed that 80.2% of adolescent basketball players had not received any training on sports nutrition prior to the study. The results of a systematic review conducted in the same country as the population in which this study was conducted similarly show that the level of nutritional knowledge of basketball players is generally inadequate (Bayar, 2023). In another study, a considerable proportion of basketball players under the age of 14 reported that they either never consumed fruit or did so only occasionally (boys: 23%; girls: 40%), while a significant number also stated that they did not eat vegetables at all (boys: 46%; girls: 70%). Furthermore, it was observed that more than half of the participants provided incorrect answers to the nutrition-related questions, indicating a lack of basic nutritional knowledge (Sánchez-Díaz et al., 2021). These findings suggest that athletes often have a limited

understanding of nutrition and sports nutrition, underscoring the ongoing need for comprehensive education in this area.

The study conducted by Şanlıer and Arıkan found that 49.8% of athletes consumed three meals daily, 8.4% consumed four meals daily, and 7.8% consumed five or more meals daily (Şanlıer & Arıkan, 2000). In another study carried out on basketball players, 43% of the athletes were found to take their daily nutrients in three main meals and 25% in four or more meals (Pulur & Cicioğlu, 2001). In another study conducted on athletes playing American football, it was found that 52% of the athletes consumed three meals and 40% consumed four meals (Baysal, 2015). In another study on tennis players, Arıkan and Şanlıer found that 59.6% consumed three meals, 24.9% consumed four meals, and 5.5% consumed five meals (Arıkan & Şanlıer, 2006). Our research shows positive similarities with scientific studies in the literature regarding the number of meals.

According to the Pittsburgh Sleep Quality Scale applied to national wrestlers, 38.5% reported good sleep quality, while 61.5% reported poor sleep quality (Tunca, 2009). In a study of Brazilian athletes participating in the 2008 Beijing Paralympic Games (Silva et al., 2012), 83.3% reported poor sleep quality. Similarly, a study of Paralympic athletes in Chile found that 78.7% experienced poor sleep quality (Duran Agüero et al., 2015). In this study, it is noteworthy that 62.8% of the participants had good sleep quality. In the examples in the literature cited above, athletes consist of the adult population. A study conducted among high school athletes on the subject reveals that 59.6% of the participants had good sleep quality, a result similar to that of this study (Potter et al., 2020). In a study, it was observed that while athletes experienced mild sleep difficulties during the non-competition period, they experienced higher sleep difficulties and worse sleep behavior during major competitions and pre-competition training camps (Mason et al., 2022). A study conducted on elite young athletes revealed that factors such as computer use before sleep, texting or making phone calls prior to bedtime, reading before sleep, and checking digital devices during the night had significant negative effects on sleep quality. In the present study, these factors are also considered potential contributors to the high prevalence of poor sleep quality observed among participants (Suppial et al., 2022). These findings suggest that sleep quality in athletes can vary significantly not only due to general lifestyle and individual differences but also due to factors such as competition periods and training intensity.

In the present study, no significant relationship was found between macronutrient intake and sleep quality ($p>0.05$). In a meta-regression study on the subject with similar results, it was observed that there was no dose-dependent relationship between sleep

duration, a key marker of sleep quality, and macronutrient intake (Sutanto et al., 2020). On the other hand, adjustments in macronutrient intake appear to influence sleep patterns; for instance, diets high in carbohydrates have been linked to reduced nighttime wakefulness, whereas higher fat intake has been associated with improvements in overall sleep quality (Lindseth & Murray, 2016). Among endurance athletes, frequent consumption of caffeinated beverages was correlated with diminished sleep quality and a greater likelihood of sleep-disordered breathing. In contrast, greater intake of whole grains was associated with a morning-type sleep preference and reduced sleep-related disturbances (Moss et al., 2022). Collectively, these findings suggest the potential impact of dietary habits on sleep quality in athletic populations, although further investigation is needed to confirm causality.

A recent study in elite athletes showed that individuals with better sleep quality had statistically significantly higher energy and protein intakes (Eroğlu et al., 2024). According to the results of a systematic review and meta-analysis, young athletes tend to consume more energy and carbohydrates compared to their non-athlete peers, with these differences influenced by variables such as age and duration of training sessions (Lehmann et al., 2023). In this study, individuals with good sleep quality had an energy intake of 2081 kcal and 84.7 g of protein, while those with poor sleep quality had an energy intake of 1855 kcal and 79.98 g of protein. In this study, energy intake and protein intake increased as sleep quality increased, but the result was not statistically significant.

Studies on cholesterol intake in adolescent basketball players are limited. However, a study conducted in 2018 found that male basketball players aged 14-18 had an average daily cholesterol intake of 678.8±417.0 mg (Kaplan, 2019). Additionally, a study evaluated the dietary habits of male youth basketball team players. It was observed that the athletes had a high fat intake, which was associated with increased cholesterol consumption (Akici et al., 2011). In our study, the daily cholesterol intake of adolescent basketball players was found to be 402.7 ± 207.6 mg in the group with good sleep quality and 363.7 ± 187.6 mg/day in the group with poor sleep quality. This value is significantly higher than the daily recommendation of 300 mg set by the Turkish Nutrition Guide 2022 (TÜBER). Related results show that there is a need for regulations and awareness-raising studies to limit cholesterol intake in the dietary programmes of athletes.

It is thought that there is a close relationship between sleep quality, sleep duration and body weight (Gupta et al., 2022; Gonnissen et al., 2013). Emerging evidence highlights the connection between sleep patterns and various health outcomes in children, including body weight, diet quality, and levels of physical activity. Inadequate sleep duration and irregular

sleep habits have been associated with a higher likelihood of developing overweight or obesity (Khan et al., 2015). Studies show that children typically sleep around 7.2 hours per night, falling short of the recommended 8 hours, and sleep efficiency appears to be particularly low among young athletes. Sleep behavior also fluctuates across training phases, with intense training often leading to shorter and less efficient sleep (Vlahoyiannis et al., 2020). In addition to insufficient sleep duration, factors such as sleep disturbances and delayed sleep phase have been independently linked to an increased risk of obesity in pediatric populations (Jarrin et al., 2013). In this study, individuals with low sleep quality were found to have a higher body mass index (BMI). A similar study in endurance athletes showed that increased body weight and body mass index were associated with lower sleep quality and duration (Moss et al., 2022). At this point, the effect of sleep on body weight control in athletes is remarkable. These insights underscore the importance of comprehensive sleep evaluations and targeted interventions in combating childhood obesity and promoting overall well-being.

Limitations

The limitations of this study include its cross-sectional design, which precludes the establishment of causal relationships. Additionally, the unequal number of male and female participants may have influenced the generalizability of the findings. The research was conducted only in three private sports clubs operating in Turkey, which may limit the representativeness of the sample and the applicability of the results to broader populations. Another important limitation is that the findings are based on self-reported data, which may be subject to recall bias or social desirability bias.

Moreover, the study lacked a detailed assessment of the participants' performance levels. Although all participants were adolescent basketball players actively training in clubs, their competitive experience, training intensity, and training duration were neither standardized nor documented. These variations could have influenced both sleep patterns and nutritional behaviors, acting as potential confounding variables. In addition, objective performance metrics such as game statistics, physical endurance, or strength tests were not included in the study. Such data could have enhanced understanding of how sleep and nutrition impact actual athletic performance. Future studies are recommended to categorize participants based on competition level (e.g., amateur, semi-professional, elite) for more precise analysis.

CONCLUSION

In conclusion, this study highlights the complex interaction between sleep quality and nutritional habits among adolescent basketball players. Although no significant relationships were found between the sleep quality and various factors such as nutrition knowledge, adherence to dietary programs, and meal patterns, athletes with better sleep quality tended to perceive their diets as sufficient and balanced. This suggests that while direct correlations between sleep and specific nutritional practices may not be statistically significant, athletes' subjective evaluations of their health and nutrition might still play a role in their overall well-being and performance.

The findings highlight the importance of promoting both good sleep quality and balanced nutrition in young athletes to support their physical and mental well-being. While sleep quality appears to be associated with body weight, further research is needed to explore the underlying factors and potential long-term effects of poor sleep and suboptimal dietary habits on athletic performance. These results underscore the need for holistic approaches in youth sports programs, combining physical training with education on sleep and nutrition to optimize the health and success of adolescent athletes.

Given the limited research on the subject, further studies are necessary to investigate the relationship between sleep quality, physical activity level, and dietary habits.

PRACTICAL IMPLICATIONS

The fact that the study focuses on adolescent basketball players provides valuable information in terms of both age group and sport branch. In addition, the number of studies on this subject in our country is quite limited. The results obtained may shed light on interventions such as sleep training and nutrition planning to improve the health status of athletes.

This study highlights that sleep quality in adolescent basketball players is closely linked to healthier eating habits and more optimal body weight, offering meaningful implications for coaches and sports scientists. Athletes with better sleep quality were found to consume more balanced diets and maintain healthier body weights. Therefore, training programs should not only focus on physical development but also incorporate strategies to improve sleep hygiene and promote consistent rest routines. Basic sleep education, including tips on consistent bedtimes and reducing screen time before sleep, can serve as a low-cost yet effective intervention to enhance recovery and performance.

Coaches and club professionals should also pay close attention to the timing and content of athletes' meals by integrating personalized nutritional support into daily routines.

Monitoring sleep and dietary patterns regularly and using these insights to inform training loads and recovery plans can help maintain consistent performance levels while reducing the risk of fatigue or overtraining. Sports scientists are encouraged to develop interdisciplinary protocols that address the unique developmental needs of adolescent athletes, combining sleep, nutrition, and physical training into a cohesive framework that supports both short-term performance and long-term health.

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Authors' Contribution

All authors were involved in the design of the manuscript and drafted the manuscript. The second author carried out the data collection. All authors analysed and evaluated the data. All authors critically revised the manuscript. All authors read and approved the final text.

Declaration of Conflict Interest

The authors declare no conflicts of interests.

Ethics Statement

Ethics committee permission was obtained from Istanbul Gedik University Non-Interventional Clinical Research Ethics Committee (Decision No: 2022/1- Date: 11/01/2022).

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