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ORIGINAL ARTICLE

Investigation of the Effect of Some Parameters Affecting the Sleep Quality of Sports-Trained Students

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ABSTRACT

Aim: The aim of this study is to investigate the effect of some parameters affecting the sleep quality of sports-trained students.

Methods: For this purpose, the Pittsburgh sleep quality scale was applied to sports-trained students. The data of 243 male and 222 female students who completed the scale truthfully were evaluated. Student t-test, one-way ANOVA, and LSD tests were used in statistical procedures.

Results: A statistically significant difference was found in the subcomponents and total sleep scores of subjective sleep quality, habitual sleep efficiency, sleep latency, sleep duration, sleep disturbance, medication use, and daytime dysfunction by gender ($p<0.05$ and $p<0.001$). There was no statistically significant difference in subjective sleep quality, sleep latency, sleep duration, sleep disturbance, daytime dysfunction, and total sleep scores with regard to team and individual sports ($p>0.05$). There was a statistically significant difference in subjective sleep quality, sleep latency, sleep duration, medication use, daytime dysfunction, and total sleep score with regard to daily training time ($p<0.05$ and $p<0.001$). The difference is not significant in the subcomponents of habitual sleep efficiency and sleep disturbance ($p>0.05$).

Conclusion: It was concluded that while gender has an effect on the sleep quality of sports-trained students, playing team and individual sports have not. In addition, it has been observed that more than 3 hours of daily training time has a negative effect on sleep quality. It is recommended that sports-trained students who train intensively should be supported in terms of sleep quality, especially female students.

Keywords: Sleep quality, Student, Athlete, Training

INTRODUCTION

Sleep is known as a non-permanent state of unconsciousness that belongs to a certain time, is regular, and a person can be awakened by sensory factors[1]. Sleep, which reoccurs at habitual intervals during the 24-hour period in humans, is a homeostatically regulated behavioral state of reduced movement and sensory responsiveness[2,3].

Insomnia is defined as difficulty in falling asleep, inability to stay asleep, and feeling tired after sleep. Distractibility, decreased pain threshold, anxiety, peevishness, hallucination, loss of appetite, difficulty in urination, diabetes, glucose intolerance, and hyperinsulinemia are some of the problems that occur in sleep disturbance[4]. Sleep quality is crucial for improving health. Because recent studies have documented that sleep disturbance has a strong effect on the risk of medical diseases, including cardiovascular disease and cancer, and the incidence of depression[5,6]. Stress, inappropriate working conditions and hours, caffeinated beverages, inadequate or excessive exercise (the lengthiness of the warm-up period, the intensity of the exercise, the amount of increased load, etc.), and disturbing environmental stimuli can cause a lack of sleep[7,8]. Insufficient amount of sleep reduces mental well-being, such functions as cognition, and learning; disrupts the growth and repair of cells, and glucose metabolism. Lack of sleep reduces immune capacity and resistance to respiratory infections[9,10]. Insufficient sleepin athletes associated with fatigue increases injuries, and hormonal and metabolic disorders; slow down sympathetic nervous system activity and cognitive functions; delays decision-making responses by impairing emotional state; decreases bodily reaction and exercise endurance[11]. Intensive training programs and insufficient sleep for many days can negatively affect both the psychology and the immunity of an individual[12,13]. Adequate amount of sleep is essential for the immune system and overall health. Complaints of sleep disturbance in women throughout life are more common than in men. Women of child-bearing age tend to have sleep disturbances due to the menstrual cycle, pregnancy, and many other hormonal changes. A decrease in sleep leads to an increase in inflammatory cytokines, which are now believed to be important in the development of health problems[14-17]. Well-controlled sleep studies conducted with healthy adults have shown that better sleep is associated with numerous superior cognitive functions, including better learning and memory[18]. Well-controlled studies of sleep deprivation have shown that lack of sleep not only increases fatigue and sleepiness but also worsens cognitive performance[19,20]. Adolescents who experience more sleep inconsistencies perform worse at school. Impaired sleep quality is inversely proportional to neurocognitive and academic performance[21-26]. It has been suggested that athletes may need more sleep than inactive individuals to allow adequate recovery and adaptations between exercise sessions, perhaps requiring 9 or 10 hours of sleep instead of the general recommendation of 7-9 hours for adults[27]. In this study, it is aimed to investigate the effect of some parameters affecting the sleep quality of sports-trained students.

MATERIAL AND METHODS

Participants: Students studying at the Faculties of Sports Sciences of Ondokuz Mayıs University participated in this study. Participants consist of 243 male and 222 female students. The Pittsburgh sleep scale (PSQI) was completed by the students on a voluntary basis before the training sessions.

Sleep Scale Assessment: The PSQI (Pittsburgh Sleep Quality Index) is a self-report scale that evaluates sleep quality and disturbance over a one-month time interval. The Pittsburgh Sleep Quality Index (PSQI) is the most commonly used overall scale of sleep quality in both clinical and research settings[28]. PSQI consists of 7 components: subjective sleep quality (component 1), sleep latency (component 2), sleep duration (component 3), habitual sleep efficiency (component 4), sleep disturbance (component 5), sleep medication use (component 6), daytime dysfunction (component 7). The scores obtained by calculating the total 7 component scores are evaluated as the total PSQI score. The score of each subcomponent is evaluated between 0-3. The total score shows a value between 0-21. High values indicate that the quality of sleep is poor, and the level of sleep disturbance is high. If the total PSQI score is ≤5, it indicates "good sleep quality", and if it is >5, it indicates "poor sleep quality"[29,30]. In this study, Cronbach's alpha coefficient was found to be 0.81.

Statistical analysis: It was found that the data had a normal distribution using the Kolmogorov Smirnov test. Student t-test, one-way ANOVA, and LSD tests were used in statistical procedures. The level of statistical significance was taken as $p<0.05$.

Restrictions: This study is restricted to university students studying at sports faculties. It has been accepted that the research group covers the entire universe. Since the Body Mass Index is considered to be roughly an indicator of good health, those who showed abnormal values were excluded from the study.

Ethics committee report: The ethics committee report of this research was received from the social sciences ethics committee of Ardahan University in 2022.

RESULTS

Table 1: Comparison of Age, Stature, Body Weight of Students by Gender

		n	Mean	S. deviation	t-test
Age	Male	243	21.82	2.60	0.15
	Female	222	21.34	2.32	
Height (cm)	Male	243	177.28	16.10	5.34**
	Female	222	168.36	16.23	
Body weight (kg)	Male	243	74.23	9.74	12.56**
	Female	222	63.11	8.46	
Body Mass Index (kg/m^2)	Male	243	23.69	2.41	4.19**
	Female	222	22.36	2.30	

Table 2: The percentage of good and poor sleep of students with regard to sleep quality

Classification of Sleep Scale	n	%
Poor sleep quality (>5 points)	262	56.3
Good sleep quality (≤5 points)	203	43.7
Total Score mean	6.18	

Table 3: Comparison of sleep components and total scale score by gender

	Gender	N	Mean	St. deviation	t	p
Subjective sleep quality	Male	243	1.11	0.72	-6.33	0.000**
	Female	222	1.54	0.74		
Sleep latency	Male	243	1.35	0.73	-5.96	0.000**
	Female	222	1.71	0.64		
Sleep duration	Male	243	0.41	0.61	-6.32	0.000**
	Female	222	0.79	0.69		
Habitual sleep efficiency	Male	243	0.12	0.32	-4.23	0.000**
	Female	222	0.28	0.45		
Sleep disturbance	Male	243	1.20	0.60	-4.61	0.000**
	Female	222	1.45	0.56		
Sleep medication use	Male	243	0.10	0.30	-2.39	0.017*
	Female	222	0.18	0.39		
Daytime dysfunction	Male	243	0.90	0.68	-6.58	0.000**
	Female	222	1.25	0.46		
Total PSQI Score	Male	243	5.21	2.58	-8.72	0.000**
	Female	222	7.23	2.40		

*p<0.05 and **p<0.001

Table 4: Comparison of sleep components and total scale score with regard to Team and Individual sports

	Branch	N	Mean	St. deviation	t	p
Subjective sleep quality	Team	266	1.26	0.72	-1.74	0.083
	Individual	199	1.39	0.81		
Sleep latency	Team	266	1.50	0.66	-0.92	0.354
	Individual	199	1.56	0.76		
Sleep duration	Team	266	0.57	0.66	-0.81	0.415
	Individual	199	0.62	0.69		
Habitual sleep efficiency	Team	266	0.14	0.35	-3.60	0.000**
	Individual	199	0.27	0.45		
Sleep disturbance	Team	266	1.29	0.63	-1.12	0.262
	Individual	199	1.35	0.54		
Sleep medication use	Team	266	0.18	0.39	2.76	0.006*
	Individual	199	0.09	0.29		
Daytime dysfunction	Team	266	1.03	0.60	-1.66	0.097
	Individual	199	1.12	0.62		
Total PSQI Score	Team	266	6.00	2.61	-1.69	0.091
	Individual	199	6.42	2.78		

*p<0.05 and **p<0.001

Table 5: Comparison of sleep components and total scale score with regard to Daily Training Duration

	Duration of training	n	Mean	St. deviation	F/LSD	P
Subjective sleep quality	Less than an hour (1)	217	1.24	0.76	4.98 3>1.2	0.007*
	2-3 hours (2)	126	1.27	0.74		
	More than 3 hours (3)	122	1.50	0.75		
	Total	465	1.32	0.76		
Sleep latency	Less than an hour (1)	217	1.44	0.80	6.81 3>1.2	0.001**
	2-3 hours (2)	126	1.48	0.59		
	More than 3 hours (3)	122	1.72	0.61		
	Total	465	1.52	0.71		
Sleep duration	Less than an hour (1)	217	0.53	0.68	9.12 3>1.2	0.000**
	2-3 hours (2)	126	0.48	0.60		
	More than 3 hours (3)	122	0.81	0.70		
	Total	465	0.59	0.68		
Habitual sleep efficiency	Less than an hour (1)	217	0.20	0.40	2.82	0.062
	2-3 hours (2)	126	0.13	0.34		
	More than 3 hours (3)	122	0.25	0.44		
	Total	465	0.20	0.40		
Sleep disturbance	Less than an hour (1)	217	1.29	0.61	0.57	0.567
	2-3 hours (2)	126	1.33	0.62		
	More than 3 hours (3)	122	1.35	0.53		
	Total	465	1.32	0.59		
Sleep medication use	Less than an hour (1)	217	0.08	0.27	6.96 1<2.3	0.001**
	2-3 hours (2)	126	0.19	0.39		
	More than 3 hours (3)	122	0.20	0.41		
	Total	465	0.14	0.35		
Daytime dysfunction	One hour (1)	217	0.95	0.75	8.47 1<2.3	0.000**
	2-3 hours (2)	126	1.13	0.38		
	More than 3 hours (3)	122	1.21	0.45		
	Total	465	1.07	0.61		
Total PSQI Score	One hour (1)	217	5.74	3.00	10.48 3>1.2	0.000**
	2-3 hours (2)	126	6.06	2.08		
	More than 3 hours (3)	122	7.09	2.45		
	Total	465	6.18	2.69		

*p<0.05 and **p<0.001

DISCUSSION

In this study, the average age of sports-trained students participating in the study was found to be 21.82 for males and 21.34 for females. Their stature is 177.28 cm for males and 168.36 cm for females. Their body weight was found to be 74.23 kg in males and 63.11 kg in females. The body mass index was identified as 23.69 kg/m^2 in males and 22.36 kg/m^2 in females (Table 1). While the ages were similar with regard to gender, the Body Mass Index was found to be statistically different (p<0.001). Although it can be considered ideal if the Body Mass Index is 21-22 kg/m^2, an increase in this figure (22 and 23) can be considered ideal for athletes[31,32]. Therefore, the Body Mass Index values of the participants are within normal limits.

Recent studies indicate that at least 18% of adults have insufficient sleep[33]. 50-78% of elite athletes have poor sleep, and 22-26% have a high level of sleep disturbance. Difficulty falling asleep, sleep fragmentation, non-restorative sleep, and excessive daytime fatigue are some of these disturbances[10]. In this study, it has been found that 43.7% of the students had well (≤5) and 56.9% had poor sleep quality. It can be said that about half of the sports-trained students get good quality sleep.

Saygılı et al. (2011) reported the average sleep quality score of the students as 6.9 in their study on college students[34]. In another study on college students, the average sleep quality score was found to be 6.5[35]. İslamoğlu et al. (2018) found that the average sleep quality score in their study was 7.16 for male students and 7.57 for female students[36]. Yaran et al. (2017) noted an average sleep quality score of 5.71 for those who play sports[37]. Çömez and Cebi (2020) found that the sleep quality score was 3.48 in those who play sports[38]. While Guney et al. (2021) found a sleep quality score of 3.64 in male sports-trained students[39], Uzun et al. (2021) found 6.84 in female sports-trained students[40]. And in these two studies, it was concluded that male sports-trained college students have good sleep quality, and female sports-trained students have worse sleep quality. In this study, the sleep quality score was found to be 5.21 in male students and 7.23 in female students. The average sleep quality score is 6.18 (Table 2). It was found that about two-thirds of the students had poor sleep quality. In general, the following fact should not be ignored. The required amount of sleep differs greatly among individuals and can vary day after day for the same individual depending on a series of factors such as physiological or psychological stress, illness, and sleep deprivation[41,42,53,54].

There are studies reporting that although women sleep more than men, they face more sleep problems, express more sleep problems than men, and their sleep quality is worse than men[43-46]. In this study, a statistically significant difference was found in the subcomponents and total sleep scores of subjective sleep quality, habitual sleep efficiency, sleep latency, sleep duration, sleep disturbance, sleep medication use, and daytime dysfunction by gender (p<0.05 and p<0.001). Women's sleep components scores and total PSQI scores were higher in this study. In other word, it can be said that female sports-trained students have worse sleep. Various factors such as women are more stressed during their menstrual periods and they are fonder of beauty issues can also be effective in women's slightly lower sleep quality compared to men's.

Sleep duration may vary with regard to branches or in competitive athletes[12]. It is noted that the sleep quality of individual competitors in sports is more impaired than that of athletes competing as a team. This situation was considered to be based on the sharing of responsibility in team sports and taking all responsibility alone in individual sports. Since sharing responsibility reduces anxiety, it is less worrisome to participate in competition than in an individual sport, which affects sleep more positively than in an individual sport. Here it is understood that the stress factor reduces the quality of sleep[47]. Elioz et al. (2018) found a similarity in sleep quality scores of those who play team sports and those who play individual sports[48,55,56]. In this study, there was no statistically significant difference in subjective sleep quality, sleep latency, sleep duration, sleep disturbance, daytime dysfunction, and total sleep scores with regard to team and individual sports (p>0.05). In contrast, there was a significant difference in habitual sleep efficiency and sleep medication use (p<0.05 and p<0.001). Being in the same age group, having a similar sports background, training at a similar intensity, and the education they receive may contribute to the similarity in sleep components and scores of students.

It is stated that moderate physical exercise benefits the quality of sleep in all age groups in a healthy population[6]. Excessive exercise and fatigue, on the other hand, affect the biochemistry of the athlete, so sleep is also impaired due to the irregularity of the biological rhythm[11]. It is indicated that severe exercise can delay sleep and disrupt the total sleep duration[49]. Total sleep duration for elite athletes can fall below the minimum of 7 hours recommended for optimal health, especially during periods of high physical load[50]. There are studies indicating that moderate exercise facilitates sleep, while high-intensity exercise negatively affects sleep[51]. In a systematic review of elite athletes and sleep quality, poor sleep quality was reported in 38% to 57% of participants and may be more common among female athletes and participants in aesthetic sports[52]. The primary risk factors for chronic sleep disturbance in elite athletes include high exercise loads, travel, and competition-related stress. Other risk factors include team sports versus individual sports, male and female athletes, and the type of sport[10]. In this study, a statistically significant difference was found in subjective sleep quality, sleep latency, sleep duration, medication use, daytime dysfunction, and total sleep score with regard to daily training time (p<0.05 and p<0.001). The difference is not significant in the subcomponents of habitual sleep efficiency and sleep disturbance (p>0.05). The sleep components and total scores of those who train for more than 3 hours were found to be worse than the other two groups (those who train for an hour and 2-3 hours). In addition to doing daily intense training, this condition can also be caused by the fact that the group that trains for probably 3 hours may be the more intense contender group. Intensive training programs assume that adequate and high-quality sleep is necessary for many factors that contribute to sports performance such as promoting physical and mental healing, minimizing the risk of injury, and preventing in-game fatigue and decline in concentration. Indeed, coaches, trainers, and physicians all emphasize the importance of good sleep hygiene for athletes, especially on the days and nights leading up to competition[12].

CONCLUSION

It was concluded that while gender has an effect on the sleep quality of sports-trained students, playing team and individual sports have not. In addition, it has been observed that increasing the duration of daily training, drinking tea and coffee before going to be, as well as smoking and drinking alcohol negatively affect sleep quality. It is recommended that sports-trained students, especially female students, those who train intensively on a daily basis, those who drink tea and coffee before going to bed, and those who smoke and drink alcohol should be supported on good sleep quality.

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