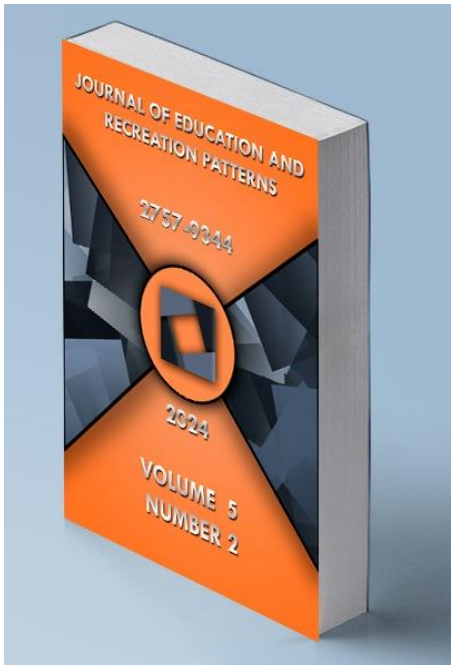

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Sleep Hygiene in Recreational Fitness Individuals

Semih KARAMAN[1], Abdullah KAYHAN[2], Yavuz SELVİ[3]

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[1] Abant Izzet Baysal University, Faculty of Sport Sciences, Department of Psychosocial Fields in Sports, Bolu, Turkey, s.karamantur@gmail.com, https://orcid.org/0000-0001-9038-9432

[2] Akdeniz University, Faculty of Sport Sciences, Department of Recreation, Antalya, Turkey, abdullah.kayhan.5@gmail.com, https://orcid.org/0000-0002-6762-979X

[3] Selçuk University, Faculty of Medicine, Department of Mental Health and Diseases, Konya, Turkey, dryavuzselvi@selcuk.edu.tr, https://orcid.org/0000-0003-0218-6796

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Sleep Hygiene in Recreational Fitness Individuals

Semih Karaman[1], Abdullah Kayhan[2], Yavuz Selvi[3]

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ABSTRACT
Sleep hygiene plays a significant role in individuals' overall health and quality of life. In this context, the study aims to examine the sleep hygiene of individuals engaging in recreational fitness in fitness centers from various socio-demographic perspectives. The research encompasses 534 individuals registered at fitness centers in the city of Konya. Participants' levels of sleep hygiene were measured using the "Sleep Hygiene Index," which is widely used and validated in the literature. The collected data were analyzed using Spearman and Pearson Correlation Tests and One-Way ANOVA tests. Additionally, partial eta squared (η^2_p) values were calculated to examine the effect sizes of all variables. The study's findings indicate that participants generally have poor sleep hygiene. It was found that demographic variables such as gender and education level did not significantly affect sleep hygiene. However, factors such as fitness history, daily sleep duration, and the preferred time of day for fitness had noticeable impacts on sleep hygiene. Specifically, participants with longer daily sleep durations had better sleep hygiene, and those with a longer fitness history similarly had better sleep hygiene. Participants who preferred to exercise in the evening had higher sleep hygiene scores compared to other groups. These results suggest that not only individuals attending fitness centers but also trainers and coaches should receive training to improve sleep hygiene, potentially enhancing individuals' physical and mental well-being.

Keywords: Fitness Centers, Recreational Fitness, Sleep, Sleep Hygiene

INTRODUCTION

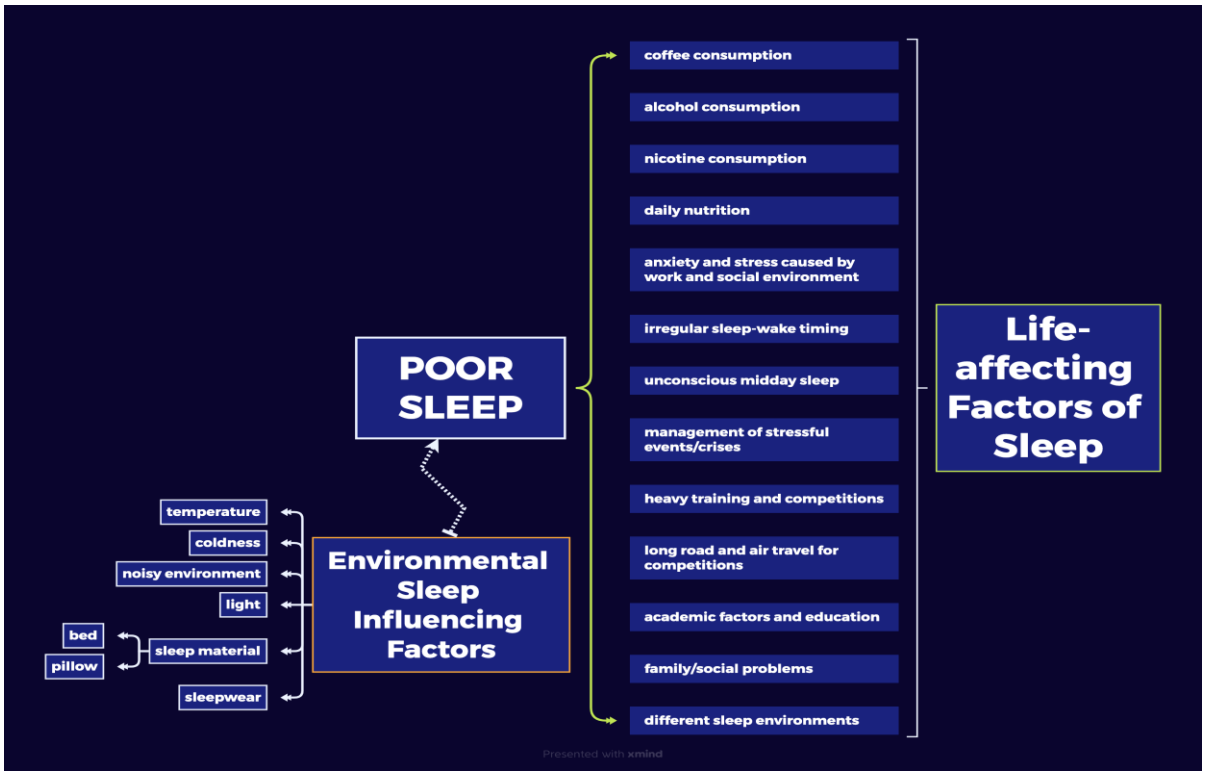
Many methods are employed to maintain and improve healthy living, such as balanced and regular nutrition, sufficient and quality sleep, and physical activity. Physical activity, one of these methods, supports individuals' physiological, psychological, and social development (Guyton & Hall, 2006). Individuals participate in fitness centers for various reasons, including coping with diseases, ensuring a quality aging process, developing motor skills (strength, speed, agility, coordination, endurance), improving physical and psychological health, socializing, self-actualization, managing stress, controlling weight, increasing muscle mass, and enhancing overall health (Klaber, 2010; Güdül & Yücel, 2022). To achieve these goals, fitness centers offer their participants regular and well-equipped exercise opportunities (Eberle et al., 2004).

It is known that individuals who participate in sports centers during their leisure time exhibit positive attitudes toward leisure activities and have high levels of life satisfaction (Kayhan et al.,2024; Doğan & Ünal, 2024). Their strong motivation for physical activity and healthy living habits also shapes their behaviors and preferences in recreational sports centers. Individuals attending sports centers for recreational purposes often focus on fitness and nutrition programs and may seek ergogenic aids and dietary supplements (Wierzejska, 2021). However, it is known that sleep, which has a direct impact on improving and maintaining physical health and fitness, is often neglected (Buysse, 2014; Karaman, 2023; Simpson et al., 2017; Lim et al., 2023). This neglect can hinder individuals from fully achieving their goals in attending sports centers. Lack of sleep can cause problems in energy metabolism, tissue and muscle cell regeneration, immune cell function, and delay repair processes, leading to imbalances in body homeostasis, mental fatigue, increased risk of injuries and inflammation, and weakened chemical responses to inflammation (Milewski et al., 2014; Chennaoui et al., 2021; Chow, 2022; Karaman, 2023). In another study of ours, we identified that poor sleep quality, especially in women, could negatively impact body image and lead individuals to develop a more negative attitude toward themselves (Karaman et al., 2024). The restorative theory of sleep, from a theoretical perspective, posits that sleep is necessary for repairing and renewing the components required for biological functions consumed by the body during wakefulness (Brinkman et al., 2018). This theory is supported by literature stating that many functions, such as exercise-induced muscle repair, tissue development, protein synthesis, and the release of hormones essential for growth, primarily occur during sleep (Colten & Altevogt, 2006; Siegel, 2005; Zambotti et al., 2019; Pace-Schott & Spencer, 2015).

Given its impact on health, sleep is one of the most critical factors in meeting the expectations of individuals who choose sports centers to maintain physical health and cope with stress (Simpson et al., 2017; Chennaoui et al., 2021; Karaman, 2023). Due to the physical and psychological stress experienced throughout the day, individuals attending sports centers to alleviate this stress also need to pay attention to their sleep. However, the fact that individuals do not make enough self-assessments in assessing their sleep quality shows that there is insufficient research evaluating the possible consequences of sleep deprivation in sports centers (Simpson et al., 2017). Conversely, individuals can improve their sleep quality independently of personal evaluations by adhering to sleep hygiene rules (Polat & Karasu, 2022; Turgay & Polat, 2019; Muz et al., 2021; Barati & Amini, 2020; Driller et al., 2019; Vitale et al., 2019). Identifying and addressing deficiencies in sleep hygiene behavior or pre-sleep environment can help correct poor and inadequate sleep (Caddick et al., 2018).

Figure 1

Factors contributing to poor sleep (Chow, 2022)



Sleep hygiene is a phenomenon that includes multiple behaviors and environmental regulations that may affect the quality of sleep. It has been reported that daytime sleepiness decreases and sleep quality and duration increase with increased awareness of sleep hygiene (Chow, 2022). Regular exercise, which is a particularly important sleep hygiene condition, is known to significantly reduce the delay in falling asleep, increase sleep efficiency, and have positive effects such as neurotransmitter regulation and body temperature control (Seol et al., 2021; Ghiasvand & Irandoust, 2024). Creating an exercise routine for the effectiveness of the effects, outdoor and indoor exercises can also prevent the occurrence of sleep problems (Roveda et al., 2017). Individuals generally prefer sports centers, especially for recreational activities and maintaining a healthy state. However, previous studies in sports centers have generally focused on themes such as leisure attitude (Kayhan et al., 2024), life satisfaction (Doğan & Ünal, 2024), mental health, self-concept and well-being (Doğan, 2015; Khair et al., 2021; Hall & Noonan, 2023). Other studies related to sleep hygiene have typically been conducted with samples such as university students (Gümüştakım et al., 2020; Molu et al., 2021), older adults (Üzer & Yücens, 2022), and cancer patients (Çayköylü et al., 2021). Despite the significant impact of sleep and attention to sleep hygiene on overall health (Baranwal et al., 2023), the lack of studies on sleep hygiene among individuals who prefer gyms for fitness is noteworthy. Therefore, this study aims to conduct a survey on the level of sleep hygiene among individuals attending sports centers for recreational purposes, considering different variables. The findings of this study are expected to contribute to raising awareness about sleep hygiene in the fields of fitness and recreation. Additionally, it is anticipated that the results will pave the way for future research exploring the potential relationships between sleep hygiene and individuals' physical performance, motivation, and overall quality of life. The emphasis on the importance of sleep hygiene for recreational fitness center users could form a basis for the development of awareness programs and personalized counseling services in these settings. In this way, the study aims to address a significant gap in academic literature while supporting health-oriented interventions for gym users.

METHOD

Research Design

This research was designed using quantitative research methods, which are systematic approaches for investigating phenomena through numerical data and statistical analysis to determine patterns, relationships, or causalities (Büyüköztürk et al., 2008). Quantitative research allows for objective measurement and analysis, making it particularly suitable for exploring the relationships between variables in a structured and replicable manner. Additionally, the study employed a correlational survey model, a specific approach within quantitative research that aims to determine the presence and strength of relationships between two or more variables without manipulating them (Fraenkel et al., 2012). This model is widely used in social sciences to explore associations and make predictions based on existing patterns. In this context, the correlational design provided a framework to examine the interplay between the variables under investigation systematically and comprehensively.

Population and Sample

The population of the research consists of all individuals who engage in fitness at fitness centers. The sample group representing the population includes 534 individuals registered at fitness centers in Konya who regularly engage in fitness activities. The convenience sampling method was used for sample selection, which includes sample groups that the researcher can easily access (Yener & Abdulkadir, 2007). 63.5% of the participants were male and 36.5% female. Their level of education was high school (27.5%), associate degree (15.4%), bachelor's degree (continuing) (39.1%), bachelor's degree (graduate) (9.2%) and postgraduate degree (8.8%). Fitness history was expressed as less than 6 months (35.2%), 1-2 years (28.7%), 3-4 years (14.4%) and 5 years or more (21.5%). Daily sleep duration mostly varied between 6-7 hours (53.4%) and 7-9 hours (30.3%). The frequency of weekly exercise was usually 2-3 times (37.1%) and 4-5 times (41.6%). The preferred time to exercise was in the evening (41.2%) and in the afternoon (28.3%). Sleep quality scores were mostly in the range of 51-75 (51.5%). The mean age was 27.42 years for men and 27.34 years for women (Table 1).

Data Collection Tools

During the data collection phase, voluntary participants were informed about the study, and data was collected 1:1. Participants were administered a socio-demographic data form determined through a literature review suitable for the purpose of the research and the "Sleep Hygiene Index" consisting of 13 items.

Sleep Hygiene Index: To determine the sleep hygiene of the participants, the "Sleep Hygiene Index," validated and reliable by Mastin et al. (2006) and adapted into Turkish by Özdemir et al. (2015), was used. The index consists of 13 questions in a 5-point Likert scale format. The index aims to evaluate the presence of sleep hygiene. The scores range from 13 to 65, with higher scores indicating poorer sleep hygiene. The internal consistency coefficient (Cronbach's Alpha value) of the index was determined to be 0.70. In this study's sample group, the Cronbach's Alpha value of the index was found to be 0.81. Values of 0.70 and above are considered acceptable, while values of 0.80 and above are considered good. In this case, a value of 0.81 indicates that the measurement tool used in the study has a high internal consistency. Additionally, partial eta squared (ŋ2p) was calculated to examine the effect sizes. The ŋ2p values of our study variables were found to be as follows: Gender = 0.09, Education Level = 0.08, Fitness History = 0.08, Daily Sleep Duration = 0.09, Weekly Fitness Frequency = 0.08 (low effect size), Preferred Time of Day for Fitness = 0.13, and Subjective Sleep Quality Score = 0.17 (medium effect size) (Hopkins et al., 2009).

Data Analysis

Two researchers worked together during data analysis to minimize the margin of error in preparing the data draft. Skewness and kurtosis values (+1,5) were referenced for the distribution of the obtained data (Tabachnick et al., 2013). It was found that the age variable did not show a normal distribution, while gender, education level, fitness duration, daily sleep duration, weekly fitness frequency, preferred time of day for training, and subjective sleep quality scores were parametric, and variances were homogeneous. Accordingly, Spearman and Pearson Correlation Tests, Independent Samples T-Test, and One-Way ANOVA tests were used on the data. For data reliability, 10 incorrectly and incompletely filled data entries were excluded from the study. Analyses were performed without including missing data for each variable. The significance value of the study was accepted as $p<0.05$.

Ethical Procedures

This research was conducted with ethical approval number 2023/11 obtained from the Bolu Abant Izzet Baysal University Social Sciences Human Research Ethics Committee. During the data collection phase, a voluntary consent form was obtained from the participants, and detailed information was provided about the purpose of the study and how to fill out the data collection tool. The anonymity of the obtained data was ensured by recording the data in an online storage application accessible only by the researchers.

FINDINGS

Table 1

Distribution of Descriptive Variables of the Participants

Variables	Categories	N	%
Gender	Male	339	63,5
	Female	195	36,5
Education Level	High School	147	27,5
	Associate degree	82	15,4
	Bachelor's (Currently)	209	39,1
	Bachelor's (Graduate)	49	9,2
	Postgraduate	47	8,8
Fitness History	Less than 6 months	188	35,2
	1-2 Years	153	28,7
	3-4 Years	77	14,4
	5 Years and Above	115	21,5
Subjective Daily Sleep Duration	Less than 5 hours	66	12,4
	6-7 hours	285	53,4
	7-9 hours	162	30,3
	More than 9 hours	21	3,9
Weekly Fitness Frequency	Once a week	49	9,2
	2-3 times a week	198	37,1
	4-5 times a week	222	41,6
	6-7 times a week	65	12,2
Preferred Time of Day for Fitness	Morning	85	15,9
	Noon	78	14,6
	Afternoon	151	28,3
	Evening	220	41,2
Subjective Sleep Quality Score	0-25 points	31	5,8
	26-50 points	88	16,5

	51-75 points	275	51,5
	76-100 points	139	26,0
		X	**SD.**
Age	Male	27,42	7,64
	Female	27,34	7,99

When examining the descriptive characteristics of the participants, it is observed that 63.5% are male, the majority (39.1%) have a bachelor's degree, 35.2% have less than 6 months of fitness history, 53.4% report subjective daily sleep durations of 6-7 hours, 41.6% engage in fitness 4-5 days a week, 41.2% prefer to do fitness in the evening, and 51.5% have subjective sleep quality scores between 51-75. The ages of male participants were 27.42+7.64, while the ages of female participants were 27.34+7.99.

Table 2

Independent T-Test and Spearman Correlation Test Results of Sleep Hygiene Index Scores by Gender

Gender	**n**	$\overline{x}$	**Sd**	**t**	**p**	**d**	**Variable**	**r**	**p**
Male	339	32,65	9,42	1,360	,174	0.012	Age*Total Index Score	-,273**	,000
Female	195	31,53	8,59					-,299**	,000

n=Sample Size, $\overline{x}$*=Mean, Sd=Standard Deviation, t= t value, p= Significance Value (p<0,05), d= Cohen's d value, r= Correlation Value*

The sample comprised 339 male participants, who achieved a mean score of 32.6549 (SD = 9.42372), and 195 female participants, with a mean score of 31.5385 (SD = 8.59467). The t-test result (t = 1.360, p = .174) indicates no statistically significant difference between the gender groups (p > .05), with a minimal effect size (d = 0.012). Furthermore, the correlation analysis reveals a significant negative relationship between age and total index score for both genders: r = -.273** for males and r = -.299** for females, both with p = .000, suggesting a statistically significant inverse correlation for each group (p < .01).

Table 3

Pearson Correlation Test Results of Subjective Sleep Quality, Subjective Daily Sleep Durations, and Sleep Hygiene Index Scores

		Total Index Score	**Subjective Sleep Quality Score**	**Education Level**	**Fitness History**	**Subjective Daily Sleep Duration**	**Weekly Fitness Frequency**	**Preferred Time of Day for Fitness**
Total	r	-	-,258**	-,016	-,066	-,097*	-,048	-,169**
Index	p	-	,000	,719	,131	,025	,271	,000
Score	n	-	533	534	533	534	534	534
Subjective Sleep	r	-,258**	-	,053	,102*	,263**	,164**	,005
Quality	p	,000	-	,221	,019	,000	,000	,904
Score	n	533	533	533	532	533	533	533
Subjective	r	-,097*	,263**	,017	,055	-	,021	,063
Daily	p	,025	,000	,688	,204	-	,624	,149
Sleep Duration	n	534	533	534	533	-	534	534

n= Sample Size, p= Significance Value (p<0,05), r= Correlation Value

A negative and statistically significant relationship was found between total index score and subjective sleep quality score (r = -0.258**, p < 0.001, n = 533). There was no significant relationship between education level and total index score (r = -0.016, p = 0.719, n = 534). Similarly, no significant relationship was found between fitness history and total index score (r = -0.066, p = 0.131, n = 533). However, a negative and significant relationship was observed between subjective daily sleep duration and total index score (r = -0.097*, p = 0.025, n = 534). No significant relationship was found between weekly fitness frequency and total index score (r = -0.048, p = 0.271, n = 534). However, a negative and statistically significant relationship was found between preferred time of day for fitness and total index score (r = -0.169**, p < 0.001, n = 534).

When examining the correlation results between subjective sleep quality score and other variables, no significant relationship was found between education level and subjective sleep quality score (r = 0.053, p = 0.221, n = 533). However, a positive and significant relationship was found between fitness history and subjective sleep quality score (r = 0.102*, p = 0.019, n = 532). A positive and statistically significant relationship was found between subjective daily sleep duration and subjective sleep quality score (r = 0.263**, p < 0.001, n = 533). A positive and statistically significant relationship was also found between weekly fitness frequency and subjective sleep quality score (r = 0.164**, p < 0.001, n = 533). No significant relationship was found between preferred time of day for fitness and subjective sleep quality score (r = 0.005, p = 0.904, n = 533).

When examining the correlation results between subjective daily sleep duration and other variables, no significant relationship was found between education level and subjective daily sleep duration (r = 0.017, p = 0.688, n = 534). No significant relationship was found between fitness history and subjective daily sleep duration (r = 0.055, p = 0.204, n = 533). No significant relationship was found between weekly fitness frequency and subjective daily sleep duration (r = 0.021, p = 0.624, n = 534). Additionally, no significant relationship was found between preferred time of day for fitness and subjective daily sleep duration (r = 0.063, p = 0.149, n = 534).

Table 4

One-Way ANOVA Results of Descriptive Variables and Sleep Hygiene Index Scores

Variables	Categories	n	$\overline{x}$	Sd		SS	MS	f	p	η²
Education Level	*High School*	147	31,52	8,12	B.G.	527,44	131,86	1,586	,177	,012
	Associate Degree	82	34,30	10,01						
	Bachelor's (Currently)	209	32,27	9,66	W.G.	43973,92	83,12			
	Bachelor's (Graduate)	49	32,28	8,64						
	Postgraduate	47	30,76	8,33						
Fitness History	*(A) Less Than 6 Months*	188	31,46	8,18	B.G.	1764,15	588,05	7,279	,000 a-b* b-d**	,040
	(B) 1-2 Years	153	34,69	9,59						
	(C) 3-4 Years	77	32,93	9,94	W.G.	42736,64	80,78			
	(D) 5 Years And Above	115	29,79	8,73						
Subjective Daily Sleep Duration	*(A) Less Than 5 Hours*	66	35,86	10,01	B.G.	1166,80	388,93	4,757	,003 a-b* a-c*	,026
	(B) 6-7 Hours	285	31,90	9,010						
	(C) 7-9 Hours	162	31,14	8,78	W.G.	43334,56	81,76			
	(D) More Than 9 Hours	21	34,09	8,11						

Weekly Fitness Frequency	*(A) Once*	49	32,51	8,52	B.G.	139,55	46,51	,556	,644	,003
	(B) 2-3 Times	198	32,84	9,40						
	(C) 4-5 Times	222	31,8694	9,21	W.G.	44361,81	83,70			
	(D) 6-7 Times	65	31,52	8,57						
Preferred Time of Day for	*(A)Morning*	85	33,57	11,91	B.G.	1824,11	608,03	7,551	,000 a-d* b-d**	,041
	(B)Noon	78	35,67	8,71						
	(C)Afternoon	151	32,41	8,51	W.G.	42677,25	80,52			
	(D)Evening	220	30,40	8,00						
Subjective Sleep Quality Score	*(A)0-25*	31	36,96	6,69	B.G.	3637,55	1212,51	15,698	,000 a-d** b-d** c-d**	,082
	(B)26-50	88	33,94	7,71						
	(C)51-75	275	33,26	9,33	W.G.	40860,73	77,24			
	(D)76-100	139	28,08	8,71						

No significant difference was found in subjective sleep quality scores among participants' education levels ($f(4, 526) = 1.586$, $p = 0.177$), indicating that education level does not have a statistically significant impact on sleep quality. However, a significant difference was observed among fitness history groups ($f(3, 530) = 7.279$, $p = 0.000$), indicating that fitness history affects subjective sleep quality and that this group obtained higher scores. A significant difference was also found in subjective daily sleep durations ($f(3, 510) = 4.757$, $p = 0.003$), showing that longer daily sleep durations are associated with higher sleep quality. Weekly fitness frequency was found to have no significant impact on subjective sleep quality ($f(3, 532) = 0.556$, $p = 0.644$). However, a significant difference was found among preferred times of day for fitness ($f(3, 532) = 7.551$, $p = 0.000$), with those who prefer to train in the evening having lower sleep quality scores. Significant differences were also found in subjective sleep quality scores ($f(3, 530) = 15.698$, $p = 0.000$), with individuals having lower sleep quality scores statistically lower sleep quality scores. The analysis of variance (ANOVA) results revealed the following effect sizes calculated using eta squared (η^2): Education Level showed a small effect ($\eta^2 = 0.012$), while Fitness History and Preferred Time of Day for Fitness indicated moderate effects ($\eta^2 = 0.040$ and $\eta^2 = 0.041$, respectively). Daily Sleep Duration demonstrated a small to moderate effect ($\eta^2 = 0.026$), Weekly Fitness Frequency had a negligible effect ($\eta^2 = 0.003$), and Subjective Sleep Quality Score exhibited a substantial effect ($\eta^2 = 0.082$) (Cohen, 2013).

DISCUSSION

In this study, the sleep hygiene of individuals engaging in fitness for recreational purposes in fitness centers was examined in terms of various socio-demographic variables. It was generally found that participants had insufficient levels of sleep hygiene.

Sleep quality can be evaluated using both objective and subjective methods. Objective methods such as polysomnography (PSG) and actigraphy show high reliability in obtaining information about sleep parameters (Krystal & Edinger, 2008). However, these objective methods, like PSG (for evaluating daytime sleepiness, see the Multiple Sleep Latency Test or MSLT), are not easily accessible for most clinicians in their daily routines, as they are expensive and time-consuming (American Academy of Sleep Medicine, 2005). Even though actigraphy has economic advantages, the recorded activity is only a representation of sleep and not sleep itself (Fabbri et al., 2021). In this study, the Sleep Hygiene Index, whose scientific validity and reliability have been rigorously tested, was used to collect individuals' sleep data. The fact that this index exhibited a very high Cronbach's alpha value in this study ensured the internal consistency and reliability of the data. Therefore, the targeted outcomes of the sample

group were predicted with high accuracy. This suggests that the findings are robust and reliable and that assessments of sleep hygiene are supported by reliable data.

Gender, which is among the predictors of sleep quality and hygiene, plays an influential role in relevant situations from a young age. Sleep hygiene, which varies with gender during elementary school, identified boys as a riskier group in bedtime routines, an important sleep hygiene process, highlighting the significance of parental attitudes in this process (Uebergang et al., 2017). Similarly, studies conducted during and after adolescence also indicate that gender affects sleep hygiene (Galland et al., 2017; Peach et al., 2016; Krishnan & Collop, 2006). However, in adults, the effect of gender on sleep and sleep hygiene awareness may be more related to exercise status and overall awareness. Instead of the gender factor, adherence to physical activity processes may positively impact sleep hygiene and falling asleep (Glavin et al., 2022). Additionally, it is known that sleep hygiene generally improves as individuals age, thought to be due to past sleep experiences (Ruggiero et al., 2019; Voinescu & Szentagotai-Tatar, 2015). When examining the study's findings, the insignificant difference detected between male and female participants indicates that gender is not a determinant in this study. However, placing gender as a central variable and examining age and total index score, a negative correlation was seen with increasing age in both genders (see Table 2). This suggests that the sample group lacks adequate awareness and does not develop awareness of sleep or sleep hygiene behavior with advancing age. The poor relationship with sleep hygiene behaviors among individuals who want to support and improve their physical and mental well-being suggests that personal trainers and responsible coaches in the gym environment also lack sufficient awareness of these issues, leading to low sleep awareness among individuals attending the gym for recreational purposes. In addition, since the continuity of exercise (Ali et al., 2020) and intensity are important for good sleep, it is thought that sleep quality can be improved by increasing the active participation of individuals in training. However, a study of 4800 people reported that excessive physical activity caused difficulty falling asleep when sleep, sex and age were controlled for, while the relationship with sleep characteristics was insignificant in more recreational activities (Dubinina et al., 2021). The study, with similar results to our study, suggests that if exercise does not cause excessive physical and mental fatigue, the magnitude of the effect on sleep quality is insignificant.

It is known that individuals who pay attention to sleep hygiene patterns complete their sleep duration and reduce daytime sleepiness (Rujnan et al., 2019; Chow, 2022; Lim et al., 2023). Normally neglected sleep hygiene patterns affect individuals' sleep quality and consequently their psychological well-being (Vitale et al., 2019). According to the findings of this study, it was found that participants with the least total sleep duration had higher sleep hygiene scores than others. This suggests that individuals who report sleeping less than 5 hours pay more attention to sleep hygiene to maximize the benefit from their sleep during this limited time. Because the lack of total daily sleep duration indicates that individuals pay more attention to all sleep hygiene patterns that could affect their sleep. In addition, the available evidence is still controversial in the literature on this topic; in particular, there are studies that have found poorer sleep quality and sleep hygiene in athletes compared to age-matched sedentary groups (Cameron et al., 2021).

When examining the study findings, no significant relationship was found between the participants' weekly fitness frequency and sleep hygiene scores. In the literature, increasing physiological load is known to increase the recovery time, suggesting that increasing fitness frequency brings along a need for rest and sleep (Simpson et al., 2017; Vitale et al., 2019; Ali et al., 2020). Additionally, it is recommended for athletes to extend their sleep duration due to increased load (Silva et al., 2021; Coel et al., 2023). Furthermore, examining the findings related to the preferred time of day for fitness, it was seen that participants who chose to exercise in the evening, followed by those who chose the morning, had the highest sleep

hygiene scores. This may be because evening exercisers pay more attention to sleep hygiene to avoid a negative impact on their sleep process, and morning exercisers pay attention to sleep hygiene to avoid daytime sleepiness, not wake up tired, and feel rested.

It is known that subjective evaluations of sleep durations and quality by individuals often yield different results from objective outcomes (Jackowska et al., 2011; Qin et al., 2023; Walsh et al., 2021; Cunha et al., 2023). Parallel to this, in our study, the negative relationship between the subjective sleep quality evaluation reported by participants and sleep hygiene (see Table 4) suggests that individuals lack sufficient knowledge and awareness in evaluating sleep hygiene. Thus, despite evaluating their subjective sleep quality as good, their sleep hygiene showed a negative relationship. This situation has also been observed in different sample groups in the literature (Qin et al., 2023; Walsh et al., 2021; Cunha et al., 2023), and our conclusions are in parallel with the known literature.

Conclusion

In conclusion, it was found that the sleep hygiene of individuals engaging in recreational fitness in fitness centers is generally inadequate. Demographic variables such as gender and education level did not create significant differences in sleep hygiene. However, variables such as fitness history, daily sleep duration, and the preferred time of day for fitness were found to have an impact on sleep hygiene. Specifically, participants with longer daily sleep durations were found to have better sleep hygiene. Similarly, participants with a longer fitness history reported better sleep hygiene. Participants who preferred to exercise in the evening had higher sleep hygiene scores compared to other groups. As a precursor to sleep quality, increasing individuals' sleep hygiene behaviors and awareness is thought to have positive effects on their psychological, mental, and physiological health. These findings suggest that the scheduling of exercise programs in fitness centers should be planned to enhance sleep hygiene and that community-level interventions aimed at increasing awareness of sleep hygiene could contribute to improving individuals' overall health and quality of life.

Recommendation

Based on the results of this study, several recommendations can be made to improve the sleep hygiene of individuals engaging in recreational fitness in sports centers. Firstly, informative seminars and training programs on sleep hygiene can be organized in sports centers. These programs can provide participants with information about the importance of sleep hygiene, creating an appropriate sleep environment, limiting the use of electronic devices, and healthy sleep habits. Second, sports centers can offer counseling services aimed at improving individuals' sleep quality, helping them assess and improve their personal sleep habits. Future research should use longitudinal designs to evaluate the long-term effects of sleep hygiene education and conduct studies on different demographic groups. Furthermore, the use of objective sleep measurement techniques (e.g., actigraphy or polysomnography) can provide a more accurate assessment of sleep hygiene and quality. Finally, incorporating a mixed-methods approach to capture both quantitative and qualitative insights is encouraged to achieve a deeper understanding of personal sleep hygiene practices. More research is needed to determine how effective such interventions are in improving exercise performance and overall health.

Limitations:

This study has certain limitations. The research was conducted in more than ten fitness centers located exclusively in the province of Konya, which may limit the generalizability of the findings due to geographical constraints. The data collection instrument used, the 'Sleep Hygiene Index,' relies on participants' self-reported evaluations, and objective sleep measurement methods (e.g., polysomnography or actigraphy) were not employed in the study.

This may pose a limitation to the accuracy of the findings. Although the study design is suitable for collecting quick and valuable data from a large participant group, it was conducted using a cross-sectional method, which prevents the establishment of causal relationships. Moreover, participants may tend to report their sleep hygiene and habits more positively than they actually are due to social desirability bias. This could lead to a deviation in the results from the actual circumstances.

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