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Original Article

Determining the Relationship Between Sleep Quality and Physical Activity in Adults

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Abstract

The aim of this study was to examine the relationship between sleep quality and physical activity. This study was planned as a descriptive relational study. The study was carried out with 317 adult individuals registered in a Family Health Center located in Selçuklu district of Konya province. A personal information form, prepared by researchers and questioning socio - demographic characteristics, International Physical Activity Questionnaire and Pittsburgh Sleep Quality Index were used. Two independent samples t-test and one-way Anova were used for normally distributed data. It was observed that as the physical activity score averages of the individuals increased, the sleep quality score averages decreased. In line with the results of the study, it was found that there is a significant relationship between the physical activity levels of individuals and their sleep quality. It has been concluded that individuals get better quality sleep with the increase in their physical activity level.

1. Introduction

Sleep is essential for health and important for physical, cognitive, and psychological health (Chaput et al. 2020; Medic, Wille, & Hemels, 2017; Sullivian Bisson et al., 2019). Good sleep health is expressed by the duration, quality and timing of sleep that leaves a person satisfied with their sleep and alertness throughout the day (Buysse 2014). In the evaluation of sleep quality, there are components such as sleep delay, sleep duration, presence of "insomnia", use of sleeping pills and daytime functioning (Barbato, 2021). Problems with sleep can contribute to psychosocial and medical problems. In a systematic and meta-analysis study, it was reported that short sleep duration is associated with health outcomes

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such as diabetes mellitus, hypertension, cardiovascular diseases, coronary heart diseases and obesity (Itani, Jike, Watanabe, & Kaneita, 2017).

It is important to have a good sleep quality in order to prevent these health problems. It is stated that sleep quality may be associated with variables such as sociodemographic characteristics (Hinz et al., 2017; Duncan et al. 2020; Şahin, Yildirim, Aşilar, Çebi, & Güneş, 2020), physical activity (Sullivan Bisson, Robinson, & Lachman, 2019; Memon et al. 2021).

When the literature on the subject is examined, it has been reported that there is a positive relationship between physical activity and sleep quality (Memon et al., 2021; Stefan, Sporiš, Krističević, & Knjaz, 2018). However, it is stated that it does not provide an idea about the way these behaviors occur together. For example, active people may report short sleep duration but do better than less active people who sleep longer but have poor sleep quality (Rayward et al., 2017). Given the health impact and potential synergistic effects of physical activity and sleep (Rayward et al., 2017), investigating how different physical activity and sleep patterns co-occur may help identify target populations for multi-behavioral interventions.

On the other hand, it is stated that there is a bidirectional relationship between physical activity and sleep, in this direction, physical activity improves sleep health (for example, sleep quality) indicators, and good sleep health is also associated with higher levels of physical activity (Klinie 2014). In this direction, it is thought that it will contribute to the determination of the relationship between physical activity and sleep quality of the individuals in the study sample group. At the same time, it will guide the intervention studies to be carried out on the subject in line with the results to be obtained. For these reasons, this study aimed to determine sleep quality and physical activity level in adults; The aim of this study was to examine the relationship between sleep quality and physical activity.

2. Material and methods

Purpose of research and questions of the research

For these reasons, this study aimed to determine sleep quality and physical activity level in adults; The aim of this study was to examine the relationship between sleep quality and physical activity.

Research Questions

1. What is the sleep quality and physical activity level of adults?

2. Does the quality of sleep change according to the socio-demographic characteristics of adults?

3. Is there a relationship between individuals' physical activity level and sleep quality?

Type of research.

This study was planned as descriptive relational.

The place and features of the research

The study was carried out in a Family Health Center region located in Selçuklu district of Konya province.

Study group of the research

The sample size in the study was calculated in the G*Power 3.1.9.2 analysis

program. With an effect size of 0.2041096, a power of 95%, and a margin of error of 5%, Şahin et al. (2020), taking into account the total sleep score average (7.44 ± 3.65), it was calculated as 314.

The inclusion criteria of the study were individuals aged 18 and over, literate; Exclusion criteria are individuals with a psychiatric diagnosis.

Data Collection Techniques and Tools

The data of the research were collected between January 1st and March 30th 2022 via Google Forms. The surveys will be delivered to the participants via social media; The data collection process was terminated after the sufficient number of samples was reached. In the collection of data; A personal information form, prepared by researchers and questioning socio-demographic characteristics, International Physical Activity Questionnaire and Pittsburgh Sleep Quality Index were used.

International Physical Questionnaire (UFAA)

In this study, the short form of the International Physical Activity Questionnaire (IPAQ) will be used to determine the physical activity levels of individuals. International validity and reliability studies Craig et al. (2003) validity and reliability studies in Turkey were conducted by Sağlam (2010) on university students. There are 7 questions in total in the survey. The 1st and 2nd questions are about vigorous activities, 3rd and 4th questions are about moderately vigorous activities, 5th and 6th questions are about walking and 7th questions about the time spent by the individual sitting. In the evaluation of all activities, the criterion is that each activity is done for at least 10 minutes at a time. A score is obtained as "MET-minutes/week" by multiplying the minute, day and MET value (multiples of resting oxygen consumption). In calculating the energy consumption for physical activities, the weekly duration (minutes) of each activity is multiplied by the MET energy values created for the International Physical Activity Questionnaire. Walking time (minutes) was multiplied by 3.3 METs to calculate the walking score. In the calculation, 4 METs were taken for moderate-intensity activity and 8 METs for vigorous activity. Thus, the energy consumption of each individual for vigorous, moderate, walking, sitting and total physical activities was obtained in MET-min/Week unit. According to the total physical activity score, the physical activity levels of the participants were "inactive (under 600 MET-min/week), moderate (minimally active) (between 600-3000 MET-min/week) and very active (3000 MET-min/week and above)" (Craig et al., 2003, Sağlam et al. 2010).

Pittsburgh Sleep Quality Index (PUKI)

It was developed by Buysse, Reynolds, Monk, Berman, and Kupfer (1989). The validity and reliability of the index in Turkey was determined by Ağargün, Kara, and Anlar (1996) A self-report scale of PSQI assesses sleep quality and sleep disturbance over a one-month period. There are a total of 24 questions in the scale. PSQI has 7 sub-dimensions: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping pills, and daytime dysfunction. The total PUKI score is the sum of 7 dimension scores. Each item is evaluated over 0-3 points, and the total score varies between 0-21. Higher scores indicate poor sleep quality. A total PSQI score of ≤5 indicates "good" and >5

indicates “bad” sleep quality. A PUKI score above 5 indicates that the person has serious trouble in at least two areas of sleep or mild or moderate distress in more than three areas. The Cronbach alpha coefficient of the index was reported as 0.80 (Agargun et al 1996).

Data Evaluation

The data of the study were evaluated using the statistical package program SPSS for Windows 22.0 (Statistical Package for Social Science). Number of units (n), percentage (%), mean±standard deviation (mean (SD)) values were used as summary statistics. The normal distribution of the data was evaluated with the Kolmogorov–Smirnov test and the Q-Q plot. Two independent samples t-test and one-way anova were used for normally distributed data. The results were evaluated at 95% confidence interval and $p<0.05$ significance level.

Ethical Procedure

Ethics permission was obtained from the Ethics Committee of the Faculty of Sport Sciences (Meeting Date: 03.12.2022; Decision no: 148) for the ethical permission of the research. Before starting the research, the informed consent form of the individuals was added to the beginning of the online questionnaire and their consent was obtained.

3. Results and Discussions

When the sociodemographic characteristics of the individuals were examined, the mean age was 33.89±6.71. 47% were female, 53% were male, 44.8% were married, 55.2% were single, 48.6% were High school and 51.4% of them are university graduates, 57.4% are employed in any job, 41.6% describe their income as medium, 46.1% perceive their health as bad and 64.7% He was found to have a chronic disease. It was found that the mean physical activity total score of the individuals was 1185.14±,800.31 (minimum active level/moderate physical activity) and the mean sleep quality score was 8.00±4.35 (poor sleep quality).

When the sociodemographic characteristics of the individuals and the sleep quality scale mean scores were compared, it was seen that women had better sleep than men, singles were married, university graduates were higher than high school graduates, and those without a chronic disease had a higher quality sleep than those with chronic diseases, and the difference was found to be statistically significant ($p<0.05$). In addition, no statistically significant difference was found between working at any job, perceived health and perceived economic status, and sleep quality scale mean scores ($p>0.05$) (Table 1).

When the relationship between age, physical activity and sleep quality of individuals was evaluated, no statistically significant relationship was found between age and physical activity and sleep quality ($p>0.05$). A strong negative relationship was found between individuals' physical activity level and sleep quality. It was observed that as the physical activity mean scores of the individuals increased, their sleep quality mean scores decreased (better sleep quality) (r:-0.892, $p<0.05$). Therefore, it can be said that as physical activity increases, sleep quality also increases (Table 2).

Table 1. *Comparison of Sociodemographic Characteristics of Individuals and Average Physical Activity and Sleep Quality Scores*

Varibles	**Sleep Quality Scale Total Score**
Gender	
Female	7,76±4,42
Male	8,24±4,31
Test value, p	t:1,077
	p:0,04*
Marital status	
The married	8,16±4,30
single	7,88±4,41
Test value, p	t:1,132
	p:0,04*
Educational status	
High school	8,35±4,42
University	7,68±4,28
Test value, p	t:0,547
	p:0,02*
Working Status	
working	7,92±4,37
Not working	8,11±4,34
Test value, p	t:0,1,662
	p:0,50
Perceived Health Status	
Good	7,87±4,24
Middle	7,94±4,38
Bad	8,10±4,40
Test value, p	F:0,406
	p:0,38
Perception of Economic Situation	
Good	7,78±4,46
Middle	8,05±4,26
Bad	8,25±4,39
Test value, p	F: 0,274
	p:0,44
Presence of Chronic Disease	
Yes	8,17±4,34
No	7,69±4,38
Test value, p	t:1,097
	p:0,03*

t: t test, F: One Way ANOVA test, *p<0,05

Table 2. *Evaluation of the Relationship Between Age, Physical Activity and Sleep Quality of Individuals*

Variebles	Age	Physical Activity	Sleep Quality
Age	1,00		
Physical Activity	r:-0,026 p:0,642	1,00	
Sleep Quality	r:-0,037 p:0,50	r:-,892 p:0,000*	1,00

r:Pearson Correlation analysis, *p<0,05

It is stated that decreased inactivity, increased physical activity and vitality can be a potential way of prevention and/or treatment to reduce sleep disorders and improve the physical and psychological health of individuals for a successful aging process in general (Mochón Benguigui, Carneiro-Barrera, Castillo, & Amaro-Gahete, 2021). It has also been reported that exercise can improve sleep quality without significant adverse effects (Banno et al, 2018). This study was conducted to determine the relationship between physical activity and sleep quality and to examine the descriptive features affecting sleep quality.

In the current study, it was found that the sleep quality of individuals (8.00±4.35) was poor. Salahuddin et al. (2017) sleep quality mean score in adults was 6.96±3.34, and Çakır et al. (2020) reported that the average sleep quality score in adults was 6.30±2.2o. These results show that the sleep quality of adult individuals is similar to the current study finding. In another study, different from this study, it was reported that sleep quality was good (5.00±3.37) (Hinz et al. 2017). In line with the results of this study, regional, cultural and socioeconomic characteristics may be effective as well as individual characteristics in sleep quality.

In the current study, a strong and significant relationship was found between physical activity and sleep quality, and it was determined that as physical activity score increased, sleep quality increased. In a study similar to the current study, it was reported that there is a relationship between individuals' daily activity minutes and sleep quality. However, in the same study, it was reported that there was no relationship between daily activity minutes and sleep duration (Sullivan Bisson et al., 2019). Another study noted that "poor sleepers" had the highest proportion of participants with less sleep time than recommended and poor sleep quality. It has been reported that these individuals have a high rate of participants with poor health characteristics and low physical activity (Rayward et al., 2017). Memon et al. (2021) showed that moderate to high-intensity physical activity is associated with lower pitspurg scores (eg, better sleep quality). Stefan et al. (2018) stated in their study that poor sleep quality is associated with insufficient physical activity. In another study, it was stated that adults who continue to engage in physical activity, especially during adolescence and adulthood, are 49% less likely to have poor sleep quality compared to those who do not constantly engage in physical activity (Canhin et al., 2021). These studies present results showing how different physical activity and sleep patterns co-occur. In line with these results, it can be

said that physical activity often has a positive effect on sleep quality.

Discussions

In addition to physical activity, it can be said that descriptive characteristics of individuals also affect sleep quality. In this study, it was determined that women, singles, university graduates, those who perceive their health and economic status well, and those who do not have chronic diseases have good sleep quality.

Similar to the present study finding, Sullivan Bisson et al. (2019) reported that women who take more steps and are more active sleep better than those who are less active. Unlike the present study results, Şahin et al. (2020) found that women had worse sleep quality than men. In the same study, unlike the results of the present study, no significant relationship was found between marital status, educational status, presence of chronic disease and sleep quality.

In another study, different from the current study findings, it was stated that those who are moderately active and sleep well are more likely to have a lower education level and report a lower health assessment (Duncan et al. 2020). These results show similarities with the results of the current study. On the other hand, there is no relationship between income perception and sleep quality, similar to the results of the current study (Şahin et al. 2020). Similar to the present study finding, Hinz et al. (2017), high socioeconomic status was associated with good sleep.

In a study, it was reported that the sleep quality of women, university graduates, and those who evaluated their economic status as moderate (Çakır et al. 2020). In this respect, the results of this study differ from the present study. In line with these results, similar and different results were reported in studies conducted with different sample groups. At the same time, it can be said that descriptive features may have an effect on sleep quality in studies on the subject.

4. Conclusions

In line with the results of the study, it was found that there is a significant relationship between the physical activity levels of individuals and their sleep quality.

It has been concluded that individuals get better quality sleep with the increase in their physical activity level. In our study, in terms of sleep quality, men, married, high school graduates, those who perceive their health as bad, those who define their economic situation as bad and those who have chronic diseases were included in the risk group.

These results highlight the importance of behavior change. Developing programs to support physical activity can support individuals' sleep quality. On the other hand, multi-behavioral interventions that affect both physical activity and sleep can be developed by considering target groups.

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