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The Effect of Physical Activity and Sleep on Quality of Life and Depression Level in 18-25 Years Old University Students

18- 25 Yaş Arası Üniversite Öğrencilerinde Fiziksel Aktivite ve Uykunun Yaşam Kalitesi ve Depresyon Düzeyi Üzerine Etkisi

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ABSTRACT

Aim: Physical activity,which involves movements exceeding basal energy levels, affects both physical and psychological health.This descriptive study examines the effects of physical activity and sleep on quality of life and depression in university students. **Methods:** A total of 141 university students aged 18-25 years were included in the study.Sociodemographic data was collected using a form.Physical activity was assessed with the International Physical Activity Questionnaire short form (IPAQ), sleep quality with the Pittsburgh Sleep Quality Index (PSQI), depression levels with the Beck Depression Inventory, and quality of life with the Quality of Life Scale (SF-36). **Results:** While there was no statistically significant correlation between PSQI,which was used to evaluate sleep duration and quality, and SF-36 sub-parameters Physical Function (r=-0.127;p=0.133) and Physical Role Difficulty (r= -0.155;p=0.066);There was a weak negative statistically significant relationship between the sub-parameters of Vitality (r=-0.281*;p=0.001),Social Functioning (r=-0.278*;p=0,001),Pain (r=-0.296*;p=0.000), General Health (r=-0.290*;p=0.000). A statistically significant relationship was found between PSQI and Emotional Role Difficulty (r=-0.300*;p=0.000), Mental Health (r=-0.409*;p=0.000) sub-parameters at a moderate negative level. There was also a statistically significant moderate positive correlation between the total scores of PSQI and Beck Depression Inventory (r=0.483*;p=0.000). **Conclusions:** Adequate sleep and physical activity improve the quality of life and mood in university students,a critical life stage.Therefore, interventions to assess and improve physical activity levels and sleep quality are necessary. In this population, physical activity levels and sleep quality should be questioned and interventions to improve them are needed.

Keywords: Physical activity; youth; mental health; adolescent; university students

ÖZET

Amaç: Bazal enerji düzeyini aşan hareketleri içeren fiziksel aktivite, bireyin hem fiziksel hem de psikolojik sağlığı üzerinde etkili olmaktadır. Bu tanımlayıcı araştırma, üniversite öğrencilerinde fiziksel aktivite ve uyku kalitesinin yaşam kalitesi ve depresyon üzerindeki etkilerini incelemeyi amaçlamaktadır. **Yöntem:** Çalışmaya 18-25 yaş arası toplam 141 üniversite öğrencisi dahil edilmiştir. Katılımcıların sosyodemografik verileri bir form aracılığıyla elde edilmiştir. Fiziksel aktivite düzeyi Uluslararası Fiziksel Aktivite Anketi-Kısa Formu (IPAQ), uyku kalitesi Pittsburgh Uyku Kalitesi İndeksi (PUKİ), depresyon düzeyi Beck Depresyon Envanteri (BDE) ve yaşam kalitesi SF-36 Yaşam Kalitesi Ölçeği ile değerlendirilmiştir. **Bulgular:** Uyku süresi ve kalitesini değerlendirmede kullanılan PUKİ ile SF-36 alt boyutlarından Fiziksel Fonksiyon (r=-0,127; p=0,133) ve Fiziksel Rol Güçlüğü (r=-0,155; p=0,066) arasında istatistiksel olarak anlamlı bir ilişki saptanmamıştır. Buna karşın, Canlılık (r=-0,281*; p=0,001), Sosyal Fonksiyon (r=-0,278*; p=0,001), Ağrı (r=-0,296*; p=0,000) ve Genel Sağlık (r=-0,290*; p=0,000) alt boyutları ile PUKİ arasında zayıf düzeyde, negatif yönde anlamlı ilişkiler gözlenmiştir. Duygusal Rol Güçlüğü (r=-0,300*; p=0,000) ve Ruhsal Sağlık (r=-0,409*; p=0,000) alt boyutları ile PUKİ arasında ise orta düzeyde negatif yönde anlamlı ilişkiler tespit edilmiştir. Ayrıca, PUKİ toplam puanı ile Beck Depresyon Envanteri toplam puanı arasında orta düzeyde, pozitif yönde istatistiksel olarak anlamlı bir ilişki bulunmuştur (r=0,483*; p=0,000). **Sonuç:** Üniversite dönemi gibi gelişimsel açıdan kritik bir yaşam evresinde, yeterli düzeyde uyku ve fiziksel aktivite, bireylerin yaşam kalitesini ve ruhsal durumunu olumlu yönde etkilemektedir. Bu nedenle, üniversite öğrencilerinin fiziksel aktivite düzeylerinin ve uyku kalitesinin düzenli olarak değerlendirilmesi ve bu alanlara yönelik iyileştirici müdahalelerin uygulanması gerekmektedir.

Anahtar Kelimeler: Fiziksel aktivite; gençlik; ruh sağlığı; ergen; üniversite öğrencileri

INTRODUCTION

Physical activity is a multifaceted construct encompassing a wide range of skeletal muscle movements, including domestic chores, ambulation, exercise, and diverse forms of artistic and sporting activities [1]. It is operationally defined as any bodily movement produced by skeletal muscles that results in energy expenditure exceeding basal metabolic levels, exerting profound effects on both physical and psychological health across the lifespan (2). Extensive empirical evidence corroborates the salutary role of physical activity in the prophylaxis and management of chronic diseases, as well as its positive association with health-related quality of life indices (3,4,5,6).

Depression, a prevalent affective disorder characterized by disturbances in mood states such as sadness, anhedonia, and irritability in response to environmental and endogenous factors, constitutes a major public health concern globally (7). Physical activity has been shown to mitigate depressive symptomatology by attenuating stress and anxiety, enhancing cognitive-emotional resilience, and promoting psychological well-being; epidemiological data indicate that physically inactive individuals exhibit a twofold higher prevalence of depressive symptoms relative to their active counterparts [8]. Moreover, engagement in moderate-intensity physical activity confers protective effects against obesity and cardiovascular pathology, ameliorates mood disturbances, and augments overall life satisfaction (9).

Sleep represents a vital biological function integral to maintaining optimal health and quality of life (10). Impaired sleep quality, characterized by alterations in sleep latency, duration, and continuity, detrimentally impacts cognitive functions including attention and memory, as well as emotional regulation, thereby exerting adverse effects on general health status and subjective well-being (11,12). The university student demographic is particularly susceptible to insufficient and poor-quality sleep, a phenomenon extensively documented in national studies, underscoring its implications for physiological and psychological health (13,14,15). Notably, depression is a principal etiological factor in sleep disturbances, with affected individuals frequently manifesting difficulties in sleep initiation and maintenance (16,17,18).

Regular physical activity has been associated with enhanced sleep quality and favorable mental health outcomes (19,20). Conversely, physical inactivity predisposes individuals to deficits in musculoskeletal

strength, postural control, and balance, which, in conjunction with compromised sleep, may culminate in diminished quality of life (21).

Despite growing recognition of these interrelationships, the extant literature reveals a paucity of integrative research exploring the simultaneous effects of physical activity and sleep quality on depression and quality of life within the university student population. This study aims to address this lacuna by systematically investigating the impact of physical activity and sleep quality on depressive symptoms and health-related quality of life among young adults, thereby contributing to a more nuanced understanding of these complex interactions.

METHODS

This descriptive study was conducted between January 1 and March 15, 2024, involving 141 undergraduate students aged 18 to 25 years enrolled at the Faculty of Physiotherapy and Rehabilitation, Pamukkale University. Participants were selected based on inclusion criteria of being free from systemic diseases and cognitive or cooperation impairments. Exclusion criteria comprised pregnancy, malignancy, presence of a pacemaker, and use of sedative or hypnotic medications. Ethical approval was obtained from the Pamukkale University Health Sciences Human Research Ethics Committee (Approval No: E.468506; Date: 28.12.2023). Written informed consent was secured from all participants prior to data collection, which was carried out via face-to-face interviews.

Sociodemographic data were obtained through a structured questionnaire capturing variables such as age, gender, and educational status. Physical activity levels were assessed using the International Physical Activity Questionnaire Short Form (IPAQ-SF), a psychometrically validated instrument for the Turkish population (27). The IPAQ-SF quantifies the frequency and duration of walking, moderate, and vigorous physical activities over the preceding seven days, with results expressed in metabolic equivalent task (MET)-minutes per week and categorized into low, moderate, and high activity levels according to established criteria.

Sleep quality was evaluated by the Pittsburgh Sleep Quality Index (PSQI), a standardized and reliable measure adapted to Turkish by Ağargün et al. (23,24). The PSQI encompasses 19 self-reported items organized into seven component scores, yielding a global score ranging from 0 to 21. Scores exceeding 5 denote poor sleep

quality.

Depressive symptomatology was measured using the Beck Depression Inventory (BDI), a 21-item self-administered questionnaire validated in Turkish by Hisli (1988) (27). Each item is rated on a 4-point Likert scale (0–3), with cumulative scores spanning 0 to 63, where higher scores correspond to greater severity of depressive symptoms.

Health-related quality of life was assessed using the Short Form-36 (SF-36) Health Survey, a comprehensive instrument validated for the Turkish population by Koçyiğit, Aydemir, and Ölmez (1999) (27). The SF-36 comprises 36 items distributed across eight domains, evaluating physical and mental health constructs, each scored on a 0–100 scale with higher scores indicating better perceived health status.

Statistical analyses were performed using SPSS version 25.0. Continuous variables were summarized as mean ± standard deviation, and categorical variables as frequencies and percentages. The normality of distribution was assessed, and given the non-parametric nature of the data, Spearman's rank correlation coefficients were calculated to examine associations among continuous variables.

An a priori power analysis conducted with G*Power 3.1 software, based on a moderate effect size (r = 0.243) derived from prior literature (27), determined a minimum sample size of 100 participants to achieve 80% statistical power at a 95% confidence interval. The final sample size of 141 exceeded this requirement, ensuring adequate power for the analyses conducted.

RESULTS

Sociodemographic Data

The study was completed with 141 participants, 103 women and 38 men. The median age of the individuals was 20 years, the median height was 1.67 m, and the median body weight was 60 kg. When body mass index (BMI) was analyzed, the median BMI of the individuals was 21.23 kg/m2. The majority of participants reported using electronic devices for 3 to 7 hours per day, indicating a high prevalence of screen time among university students. Additionally, a substantial proportion of participants engaged in daily physical activity ranging from 16 to 60 minutes. Data related to the demographic characteristics of the subjects are given in Table 1.

The results of the Spearman Correlation test applied to examine the effect of physical activity and sleep on quality of life and depression level are given in Table 2 and Table 3.

Table 1. Sociodemographic data

		n (%)	Median	IQR (25/75)
Gender	**Female**	103 (73)	-	-
	Male	38 (27)	-	-
	Total	141 (100)	-	-
Age	-	-	20	19-21
Height (m)			1.67	162-174
Weight (kg)	-	-	60	54-68.50
BMI	-	-	21.23	19.48-23.80
Daily Electronic Device Usage Time (hours/day)			3-5	3-5/5-7
Duration of Daily Physical Activity (minutes/day)			31-60	16-30/31-60

n: number of cases, %: percentage, IQR 25/75: Interquartile range.

In our study, the sub-parameters of IPAQ and SF-36, Physical Function (r=0.004; p=0.961), Physical Role Difficulty (r=0.037; p=0.667), Emotional Role Difficulty (r=0.060; p=0.483), Vitality (r=0.079; p=0.353), Mental Health (r=0.056; p=0.506), Social Functioning (r=0.012; p=0.891), Pain (r=0.042; p=0.621), General Health (r=0.068; p=0.421). At the same time, there was no statistically significant correlation between IPAQ and the Beck Depression Inventory total score used to evaluate depression levels (r=0.087; p=0.308).

Table 2. Association of physical activity with quality of life and depression level

		Physical Function (SF-36)	**Physical Role Difficulty (SF-36)**	**Emotional Role Difficulty (SF-36)**	**Vitality (SF-36)**	**Mental Health (SF-36)**	**Social Functionality (SF-36)**	**Pain (SF-36)**	**General Health (SF-36)**	**Beck Depression Inventory**
IPAQ	r	0.004	0.037	0.060	0.079	0.056	0.012	0.042	0.068	0.087
	p	0.961	0.667	0.483	0.353	0.506	0.891	0.621	0.421	0.308

*Spearman Correlation Analysis p<0.05, IPAQ: International Physical Activity Questionnaire, SF-36: Short Form-36

**The relationship between variables can be evaluated as weak if the correlation coefficient is between 0 and 0.29, moderate if it is between 0.30 and 0.64, strong if it is between 0.65 and 0.84, and very strong if it is between 0.85 and 1 [28].

However, there was no statistically significant correlation between the PSQI, which was used to assess sleep duration and quality, and the Physical Function (r=-0.127; p=0.133) and Physical Role Difficulty (r= -0.155; p=0.066) sub-parameters of the SF-36; There was a weak negative statistically significant relationship between the sub-parameters of Vitality (r=-0,281*; p=0,001), Social Functioning (r=-0,278*; p=0,001), Pain (r=-0,296*; p=0,000) and General Health (r=-0,290*; p=0,000). A statistically significant relationship was found between PSQI and Emotional Role Difficulty (r=-0.300*; p=0.000), Mental Health (r=-0.409*; p=0.000) sub-parameters at a moderate negative level. There was also a statistically significant moderate positive correlation between the total scores of PSQI and the Beck Depression Inventory (r=0.483*; p=0.000)

Table 3. Association of sleep with quality of life and depression level

		Physical Function (SF-36)	**Physical Role Difficulty (SF-36)**	**Emotional Role Difficulty (SF-36)**	**Vitality (SF-36)**	**Mental Health (SF-36)**	**Social Functionality (SF-36)**	**Pain (SF-36)**	**General Health (SF-36)**	**Beck Depression Inventory**
	r	-0.127	-0.155	-0.300**	-0.281**	-0.409**	-0.278**	-0.296**	-0.290**	0.483**
PSQI	p	0.133	0.066	**0.000***	**0.001***	**0.000***	**0.001***	**0.000***	**0.000***	**0.000***

*Spearman Correlation Analysis p<0.05, PSQI: Pittsburgh Sleep Quality Index, SF-36: Short Form-36

**The relationship between variables can be evaluated as weak if the correlation coefficient is between 0 and 0.29, moderate if it is between 0.30 and 0.64, strong if it is between 0.65 and 0.84, and very strong if it is between 0.85 and 1 [28].

DISCUSSION

This study aimed to investigate the relationship between physical activity and sleep with quality of life and depression levels among university students. Our study found a weak negative correlation between PSQI, which was used to evaluate sleep duration and quality, and the sub-parameters Vitality, Social Functioning, Pain, and General Health of the quality of life scale SF-36. A moderate negative correlation was found between PSQI and Emotional Role Difficulty and Mental Health sub-parameters. There was a moderate positive correlation between PSQI and Beck Depression Inventory total scores, and thus, the effect of physical activity and sleep on quality of life and depression levels in university students aged between 18 and 25 years was revealed. These findings are consistent with studies in the literature reporting that poor sleep quality among university students is associated with reduced quality of life and increased emotional distress. In particular,

the moderate negative correlations found between the PSQI and the Mental Health and Role-Emotional subscales highlight the psychological burden of inadequate sleep. Moreover, the moderate positive correlation observed between the PSQI and the Beck Depression Inventory total scores indicates that students with lower sleep quality and duration exhibit higher levels of depressive symptoms. This finding aligns with the existing literature, which suggests that sleep disturbances are both a symptom and a significant predictor of depression. Sleep problems may impair emotional regulation and increase cognitive fatigue, thereby contributing to mood deterioration and heightened vulnerability to depression. These results underscore the importance of sleep-related interventions, particularly for university students who may exhibit irregular sleep patterns due to academic stress, lifestyle factors, and prolonged screen time. Strategies aimed at improving sleep hygiene could make a significant contribution to enhancing mental health and overall quality of life in this age group. Many scientific studies have demonstrated the positive link between physical activity and health. Research on lifelong participation in physical activity shows that the rate of participation in physical activity decreases significantly with increasing age. This decrease is most pronounced in late adolescence, post-high school, and university years. Especially the university period is considered one of the most critical periods in acquiring or abandoning the habit of regular physical activity. Considering the social leadership roles that individuals who acquire this habit during the university period will assume after higher education, the importance of this situation increases even more (29).

According to the World Health Organization, quality of life is how individuals perceive their lives in line with their expectations, standards, interests, and goals according to their culture and value judgments. Nutrition and physical activity are essential for healthy aging and improving quality of life 30]. It is known that physical activity has positive effects not only on physical and mental health but also on quality of life, academic success, and career (31,32).

Mental health problems among university students are a growing concern in today's modern and stressful society. Therefore, coping effectively with stress and maintaining good mental health is paramount. Steptoe et al. investigated the degree of depressive symptoms in 17,348 university students aged 17-30 in 23 countries and found that the prevalence of severe depressive symptoms in university students in East Asia (e.g., Japan,

Korea) was 38% (33). Regular physical activity is known to be important for physical and mental health. For example, previous studies have shown a negative correlation between the number of steps taken and obesity, diabetes, and depression using total daily steps data as an indicator of physical activity (24,34,35).

Other studies have reported that decreased physical activity decreases sleep quality and negatively affects mental health (36,37). In our study, significant relationships were found between daily electronic device usage duration and certain dimensions of quality of life. As electronic device usage increased, negative correlations were observed with the vitality and general health subscales of the SF-36 quality of life measure, suggesting that prolonged screen time may adversely affect quality of life in these domains. Additionally, a positive correlation was found between electronic device usage duration and Beck Depression Inventory scores, indicating a potential association between increased screen time and the exacerbation of depressive symptoms. These findings highlight the potential negative impact of extended screen use on both mental and physical health among university students. Therefore, regulating screen time habits and raising awareness, particularly among young adults, may be of critical importance.

Sleep is the temporary, partial, and periodic loss of the organism's communication with the environment by stimuli of varying intensities. While this condition affects individuals' physical and mental development, it allows the most efficient fulfillment of tasks and allows the body to rest. It is also an indispensable need that affects the quality of life and health at all ages and revitalizes the body (10). In cases where sleep quality is both quantitatively and qualitatively poor, problems such as attention and memory disorders, emotional variability, hallucinations, and delusions may occur. These conditions may negatively affect individuals' work life, social life, economic status, general health, and mental status. There is a general opinion that university students generally have inadequate sleep patterns, negatively affecting their sleep quality (27). Depression, one of the leading diseases of today's society, is defined as a mood disorder. Depression ranks fourth among diseases that cause physical, social, economic, and emotional problems. Therefore, prevention and treatment of depression are essential for individual and public health. In this context, physical activity (PA) is thought to have significant effects in preventing and treating depression (38).

In our study, the effects of physical activity and sleep on quality of life and depression levels in university

students aged between 18 and 25 years were revealed. It has been shown that adequate sleep and physical activity increase individuals' quality of life and positively affect their moods in university ages, which is one of the most critical transition periods of life and where many habits are gained and lost. In conclusion, physical activity levels and sleep quality should be questioned in this population, and interventions are needed to improve them.

LIMITATIONS:

The small sample size and inclusion of only healthy university students limit the generalizability of the findings.

This study did not include an analysis of additional predictive factors that may influence quality of life and sleep quality, which may pose limitations in terms of the generalizability and comprehensiveness of the findings.

The cross-sectional design employed in this study limits the ability to infer causal relationships between variables. Additionally, data were collected through self-report measures, which may be susceptible to social desirability bias and information inaccuracies. Furthermore, the sample was restricted to healthy university students, thereby limiting the generalizability of the findings. Future research is recommended to address these limitations by utilizing larger and more heterogeneous samples alongside longitudinal study designs.

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Artificial intelligence (AI) was not used in the creation of the manuscript

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