

# Medical Students' Stress Levels Are Correlated with Their Sleep Quality and Life Satisfaction

Ervin Ozdemir<sup>1\*</sup>, Yigit Yazarkan<sup>1\*</sup>, Bilge Pehlivanoglu.<sup>2</sup>

## Abstract

**Background:** Stress and sleep disturbances associated with low life satisfaction is frequently reported during medical education, intervening with the academic achievements and general well-being of medical students. We aimed to investigate the effects of stress levels on sleep quality (SQ) and life satisfaction (LS) of the students in Hacettepe University Medical Faculty (HUMF). **Methods:** This cross-sectional study was conducted at HUMF between May and September 2022 after ethical approval. The participants (39 women and 48 men) completed a personal information form, State- Trait Anxiety Index (STAI)-I and II, Pittsburgh SQ Index (PSQI) and Satisfaction with Life Scale (SWLS). Their blood pressure, heart rate, and salivary cortisol levels were measured. **Results:** The men and women were comparable for age, body mass index (BMI), stress parameters and PSQI scores, except the higher LS in women ( $P=0.045$ ). Gender-based analysis revealed positively correlated BMI and STAI-I ( $r=0.357$ ) and II ( $r=0.501$ ) scores in women ( $P<0.05$ ), and a similar but a weaker correlation for STAI-II scores in men ( $r=0.291$ ) ( $P<0.05$ ). The study group exhibited poor SQ ( $>5$ ). The higher STAI-II scores, cortisol concentration and caffeine consumption were significantly associated with poorer SQ and LS in both genders, however, the state scores and alcohol consumption exhibited a significant relation in men, only. Higher scores for trait inventory and cortisol concentrations correlated negatively with LS in all participants. **Conclusion:** Awareness, a proactive approach, and sufficient support can help the relieve and/or manage the stress of medical students and improve SQ and LS.

## Introduction

Life satisfaction is a complex and multifaceted concept that involves an overall assessment of a person's own life, and it is an important indicator of the quality of life lived and how much pleasure one gets from the moment experienced.<sup>1</sup> Life satisfaction; is defined as the positive difference between one's expectations from life and the actual situation.<sup>2</sup> In other words, it is the emotional reaction or attitude of the person to life as a whole.<sup>3</sup> Life satisfaction is based on subjective reality and is affected by several internal and external determinants.<sup>4</sup> Genetics, mood, gender, and hormone levels are among important internal determinants, whereas geography, social status, and professional life constitute the main external determinants.<sup>5-7</sup> All of these factors affect the individual simultaneously and shape the perception of life which can be expressed as life satisfaction, as well.

Of the factors associated with life satisfaction two very important and closely related ones are sleep and stress. As these two factors systemically affect the body and change one's perceptions, they can modulate the life satisfaction.<sup>4,8</sup> The reasons for the possible interactions of these factors can be summarized as follows: Sleep is a biological process that accounts for approximately one-third of the average human lifespan. It allows the body to rest and regenerate, with positive effects on both our physical and mental

health.<sup>9-11</sup> Therefore, decreased quality of sleep results in negative effects in parallel with disturbed daily performance, as well as impairments in neuropsychiatric, endocrinologic and cardiovascular systems in the long term, and consequently, a decrease in life satisfaction.<sup>9,11,12</sup> Similarly, an individual's stress level notably affects life satisfaction. Stress, which is an indispensable part of life, increases the performance of the person when it is at adequate level, while chronic and/or higher stress negatively affects the physiological and psychological functions of the individual through direct and indirect mechanisms.<sup>13</sup> Moreover, stress has been reported to decrease, especially slow wave sleep, and increase risks for sleep deprivation and/or worsened sleep quality-associated outcomes in medical students.<sup>14,15</sup> Similarly, the life satisfaction of medical students was reported to be low and exhibit gender differences in various countries.<sup>16-18</sup>

Regarding various factors that increase stress levels and negatively affect the sleep quality of medical students in daily life, such as high work and study load, inability to spare time for recreational activities, peer and family pressures, etc., we aimed to examine the effects of sleep quality and stress levels on life satisfaction in medical school students.

<sup>1</sup> Fifth-year Medical Student, Hacettepe University Faculty of Medicine, Ankara, Turkey.

<sup>2</sup> MD, Associate Professor, Department of Physiology, Hacettepe University Faculty of Medicine, Ankara, Turkey.

\*These authors contributed equally to this work

**About the Author:** Ervin Ozdemir is a fifth-year medical student at Hacettepe University Faculty of Medicine in a six-year program. Yigit Yazarkan is a fifth-year medical student at Hacettepe University Faculty of Medicine in a six-year program, who is deeply interested in various fields of medicine and an aspiring physician-scientist.

## Correspondence:

Yigit Yazarkan.

Address: Hacettepe Mah, Tıp Fakültesi, Hacettepe Üniversitesi, 06230

Altındağ/Ankara, Türkiye.

Email: [yigityazarkan@hacettepe.edu.tr](mailto:yigityazarkan@hacettepe.edu.tr)

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## Methods

### Design

This research adopted a cross-sectional study design, aimed at evaluating the associations between sleep quality, stress levels, and life satisfaction among medical students. Participants were recruited from Hacettepe University Medical Faculty, with the study's protocols approved by the university's Non-interventional Clinical Research Ethics Board. The inclusion criteria targeted actively enrolled medical students without any chronic illnesses or medication usage history, to minimize confounding variables related to health status and medication effects on sleep or stress levels.

The study focused on measuring subjective sleep quality, anxiety levels (both state and trait), and overall life satisfaction through validated questionnaires administered in a single session. Biological markers of stress, specifically salivary cortisol levels, were also collected to provide objective measures of stress response. The combination of subjective questionnaire data with objective biological measures allowed for a comprehensive assessment of the study variables and their interrelations.

### Study Recruitment and Participants

An invitation to participate in the study was made to all the students of Hacettepe University Medical Faculty, after the study protocol was approved by the Non-interventional Clinical Research Ethics Board (Issued by 2022/13-61) of Hacettepe University. An initial interview was conducted with students who responded to the announcement and satisfied the predefined inclusion criteria, which required them to be actively enrolled as medical students and have no history of chronic illnesses or medication usage. Subsequently, the study protocol was presented to those responders who qualified, and appointments were arranged for individuals who provided their informed consent to participate in the research.

### Data Collection Procedures

The participants first filled out the participant information form on the day of the experiment. Then, they were asked to complete the Pittsburgh Sleep Assessment Questionnaire (PSQA), State and Trait Anxiety Scale (STAI)-I and II and Satisfaction with Life Scale (SWLS). All the scales/questionnaires were in Turkish, and their validity and reliability studies were performed previously.<sup>19-21</sup> Following completion of the questionnaires, we measured and recorded the heart rate and blood pressure (ERKA Sphygmomanometer, Germany and Littmann stethoscope, USA) of the participants and saliva samples were collected. The participants rinsed their mouths with distilled water, and five minutes later they were given saliva collection tubes (Salivette, Cortisol, Sarstedt, Germany) and asked to chew the tube content for about a minute and place the chewing material back into the tube. The samples were stored at -80°C until analysis. Salivary cortisol levels were measured by ELISA method using a commercial cortisol competitive ELISA kit (Invitrogen, USA) by the procedure provided by the manufacturer. Briefly, the samples

were transferred to -20°C one day before the measurement and they were allowed to reach room temperature and centrifuged at room temperature on the day of measurement. The supernatants were transferred to new tubes and diluted (1:4) as instructed by the manufacturer and the optical densities of the samples were measured by a plate reader at 450 nm (Allsheng AMR-100, Hangzhou Allsheng Instruments Co., China). The concentrations were calculated by a standard curve generated by the curve-fitting software and multiplied by the dilution factor to find the salivary cortisol concentrations.

### Instruments and Scoring

The questionnaires/scales were scored as explained below. PSQI consists of 19 items that generate seven "component" scores, including subjective sleep quality, sleep duration, and daytime dysfunction. To calculate the PSQI score, respondents needed to score each of the 19 items on a scale of 0 to 3, where 0 represents no difficulty and 3 represents severe difficulty. The scores of the items that comprise each of the seven components were then added together to generate the component scores. Once the seven component scores were calculated, they were added up to get the global PSQI score, which ranges from 0 to 21. The higher the score the worse the sleep quality, and lower scores indicate better sleep quality.

The STAI consists of two separate subscales: the state (STAI-I) and the trait (STAI-II) anxiety. The state anxiety measures the temporary, situational anxiety of the individual; "right now, at this moment". Participants were asked to rate how they are feeling using a 4-point Likert scale ranging from "not at all" to "very much so" for 20 items that inquired about feelings of apprehension, tension, nervousness, and worry. The scores for each item were then summed together to get the total state anxiety score, which ranges from 20 to 80. Higher scores indicate higher levels of anxiety. The trait anxiety, on the other hand, was designed to determine the individual's general tendency to experience anxiety over time. Participants were instructed to rate 20 items of the STAI-II for how they generally feel "on a typical day" using a 4-point Likert scale ranging from "almost never" to "almost always". The scores of the items that inquired about feelings of tension, worry, and apprehension, among others were summed together to get the total trait anxiety score, which also ranges from 20 to 80. Higher scores indicate a higher level of trait anxiety, or a tendency to experience anxiety in general.

The SWLS is a 5-item scale that measures an individual's global life satisfaction. The items in the scale were designed to assess the individual's satisfaction with different domains of life, such as work, relationships, and leisure time. The SWLS items are phrased positively, and respondents were asked to rate their agreement with each item on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree". To calculate the SWLS score, the scores of the five items were summed together. The total score ranges from 5 to 35, and higher scores indicate a greater satisfaction with life. At the end, the results are classified based

on scores, according to the original manual. Scores between 30 and 35 are categorized as "extremely satisfied," scores between 25 and 29 as "satisfied," scores between 15 and 19 as "slightly dissatisfied," scores between 14 and 10 as "dissatisfied," and scores between 9 and 5 as "extremely dissatisfied". In our analysis, these categories were represented by values ranging from 6 to 1, respectively.

### Statistical Analysis

The minimum number of participants was predetermined by power analysis (G\*Power software ver. 3.1.9.4; Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany) as 85 with  $\alpha = 0.05$  and power  $(1-\beta) = 0.80$ . Considering possible exclusions from the study, we aimed to involve 90 students to the study and finalized the study with 87 participants.

The obtained data were analyzed using the SPSS 23.0 data analysis software by a biostatistician who is blinded for the study. The distribution of the data was determined with the Shapiro-Wilks test and the normally distributed variables were evaluated with the student's t-test between groups. Mann-Whitney U test was employed for data that did not show normal distribution. Regression analysis was used to determine the relationship between sleep quality and life satisfaction with other variables. Pearson correlation was employed for the pairwise relation between parameters, and  $p < 0.05$  was considered statistically significant.

## Results

Eighty-seven medical students, 38 women and 49 men, of all grades participated in the study. The demographic and general characteristics of the participants are given in [Table 1](#). The smoking and alcohol consumption status of the students are as follows; 77 participants (88.5%) do not smoke, five students (5.7%) smoke 1-10 cigarettes/day, while five students (5.7%) smoke 10-20 cigarettes/day. In terms of alcohol use, while 39 (44.8%) of the 87 students do not consume at all, 31 (35.6%) of them consume less than once a month, 11 students (12.6%) consume every 2-3 weeks, and 6 (6.8%) students consume every week.

The parameters determining anxiety/stress and PSQI and SWLS scores are presented in [Table 2](#). The trait and state anxiety scores, MAP, HR, and salivary cortisol levels were comparable between men and women, indicating similar stress levels. The sleep quality index pointed out poorer sleep quality in men however the difference wasn't significant. The life satisfaction of the women was significantly higher compared to men ( $p < 0.05$ ).

The entire study population was assessed for STAI scores, which were categorized into three subgroups: low anxiety (ranging from 20 to 37 out of 80), medium anxiety (ranging from 38 to 44 out of 80), and high anxiety (ranging from 45 to 80 out of 80). Statistically significant correlations ( $p < 0.05$ ) are presented in [Table 3](#).

**Table 1. Age, BMI, and Smoking Habits of the Study Participants.**

Characteristic	Participants	
	Men (n=49)	Women (n=38)
Age (years)	21.93±0.66	21.23±0.72
BMI (kg/m <sup>2</sup> )	24.70±2.98	20.41±2.68 †
Smoking (%)	16.32	2.63 †

**Legend:** †  $p < 0.05$  compared to men, Age and BMI is given as Mean ± SD, BMI: Body Mass Index.

**Table 2. Stress Parameters and Scores of Sleep Quality (PSQI) and Life Satisfaction (SWLS) Scales of the Study Participants.**

Characteristic	Participants	
	Men (n=49)	Women (n=38)
STAI-1 scores	42.44±4.53	41.89±5.42
STAI-2 scores	46.08±6.35	48.31±6.71
Salivary Cortisol (pg/mL) <sup>a</sup>	1354.29±647.05	1385.52±622.36
Mean Arterial Blood Pressure (mmHg)	89.38±5.86	88.52±5.81
Heart Rate (beats/min)	84.75±12.57	86.18±12.18
PSQI Scores	6.44±2.59	6.13±2.52
SWLS scores	4.08±1.22	4.60±1.15†

**Legend:** STAI: State Treat Anxiety Index, PSQI: Pittsburgh Sleep Quality Index, SWLS: Satisfaction with Life Scale. The values are given as Mean ± SD. † $p < 0.05$  significant difference between men and women. <sup>a</sup> Reference Range: 100-3200 pg/mL

**Table 3. Significant Correlations for SWLS, PSQI and BMI Based on STAI Scores.**

STAI	SWLS	PSQI	BMI	
-1	Low (n=18)	-	-	
	Med (n=39)	-0.240†	-	
	High (n=30)	-0.252†	0.269†	
-2	Low (n=7)	-0.481†	-0.401†	0.601†
	Med (n=21)	-0.241†	0.149†	0.449†
	High (n=59)	-0.361†	0.419†	0.419†

**Legend:** STAI: State Treat Anxiety Index, PSQI: Pittsburgh Sleep Quality Index, SWLS: Satisfaction with Life Scale, BMI: Body Mass Index. † $p < 0.05$  significant difference between men and women

When groups were evaluated based on gender, BMI was positively correlated with both state ( $r = 0.357$ ) and trait ( $r = 0.501$ ) anxiety scores in women ( $p < 0.05$ ). A similar but weaker correlation was valid for trait anxiety scores in men ( $r = 0.291$ ) ( $p < 0.05$ ).

The multiple linear regression model was employed to analyze the factors influencing SWLS. In this model, life satisfaction, the dependent variable, was regressed on BMI, sleep quality (PSQI scores), and stress parameters (STAI-1, STAI-2 scores, and cortisol levels). However, the analysis indicated a statistically significant relationship solely between SWLS and gender ( $p < 0.05$ ).

The correlation analysis examining the relationship between sleep quality and life satisfaction concerning gender, smoking, alcohol and caffeine consumption, and stress parameters is presented in [Table 4](#). Accordingly, the long-term stress scores were associated with poor sleep quality in both genders, however, the state scores exhibited a significant ( $p < 0.05$ ) relation in men, only. Of the other parameters of stress higher salivary cortisol concentration was related to poor quality of sleep, i.e., high grades in PSQI. Our results pointed out decreased sleep quality with increased caffeine consumption in men and women, whereas the effect of alcohol was prominent only in men. Similar results were obtained for life satisfaction, as well. So, higher stress scores for trait inventory (STAI-II) and cortisol concentration of participants were negatively correlated with life satisfaction in all participants.

## Discussion

The findings of our study exploring the relationship between sleep quality, stress parameters, and life satisfaction, unveiled

significant associations among these variables, providing valuable insights into their intricate interplay and implications for the overall well-being of the individuals.

Sleep is a fundamental biological process that profoundly impacts human health and well-being.<sup>9</sup> Previous reports underscore the critical role of sleep quality in diverse physiological functions and pathological processes.<sup>9,11,12</sup> In the context of medical school, students encounter significant changes, such as transitioning into adulthood, gaining professional status, trying to overcome the immense pressure of heavy educational and physical workload, further complicated by specialty entrance exams, and career planning. These challenges can readily contribute to higher levels of anxiety, depression, and other psychological issues, ultimately compromising sleep quality.<sup>22,23</sup> Our results pointed out poor sleep quality in the whole study population as a PSQI score of more than five is considered poor sleep quality.<sup>24</sup> The sleep quality, although did not achieve statistical significance, was worse in men in our study, even under the comparable stress parameters. A similar study investigating the sleep quality of medical students reported poor quality, as well. However, they did not analyze the effects of gender.<sup>14</sup> Furthermore, our results revealed a noteworthy correlation between sleep quality and stress levels, particularly with STAI-2 scores, which reflect long-term or trait-related stress.

**Table 4. The Relationship of PSQI and SWLS Scores with the Other Parameters Investigated in Female and Male Students.**

Gender	Covariate	PSQI		SWLS	
		Correlations	p-value	Correlations	p-value
Men (n=49)	STAI-I	0.323 <sup>†</sup>	0.032	0.205	0.223
	STAI-II	0.481 <sup>†</sup>	0.049	-0.327 <sup>†</sup>	0.049
	Salivary Cortisol Concentration (pg/mL)	0.297 <sup>†</sup>	0.033	-0.284 <sup>†</sup>	0.044
	Mean Arterial Blood Pressure (mmHg)	0.171	0.713	0.096	0.143
	Heart Rate (beats/min)	0.095	0.539	0.137	0.554
	Smoking	0.236	0.113	-0.218	0.168
	Alcohol	0.302 <sup>†</sup>	0.047	-0.273 <sup>†</sup>	0.038
	Caffeine	0.386 <sup>†</sup>	0.013	0.267	0.100
Women (n=38)	STAI-I	-0.122	0.456	0.072	0.687
	STAI-II	0.469 <sup>†</sup>	0.013	-0.370 <sup>†</sup>	0.023
	Salivary Cortisol Concentration (pg/mL)	0.319 <sup>†</sup>	0.027	-0.431 <sup>†</sup>	0.040
	Mean Arterial Blood Pressure (mmHg)	0.118	0.163	0.018	0.343
	Heart Rate (beats/min)	0.105	0.625	0.125	0.154
	Smoking	-0.195	0.319	0.145	0.498
	Alcohol	-0.010	0.961	-0.059	0.784
	Caffeine	0.282 <sup>†</sup>	0.048	-0.191	0.304

**Legend:** STAI: State Treat Anxiety Index, PSQI: Pittsburgh Sleep Quality Index, SWLS: Satisfaction with Life Scale, BMI: Body Mass Index  
<sup>†</sup>P < 0.05 significant difference between men and women.

highlighting the adverse impact of chronic stress on sleep quality. A study conducted among preclinical medical students from Saudi Arabia, similar to our findings, indicated a significant correlation between sleep quality and stress levels, while reporting no meaningful association between gender and sleep quality.<sup>25</sup> They also emphasized the relationship between reduced sleep quality and increased stress levels during examination periods, which were administered on a 3–6-week block system, resembling our university's preclinical exam program.

Notably, women displayed significantly higher levels of life satisfaction compared to men, and this disparity was statistically significant. Previous reports on gender and life satisfaction among different age groups, questioning various occasions, indicate similar findings.<sup>26,18</sup> The gender-specific analyses revealed a positive correlation between BMI and both state and trait anxiety scores in women. Similarly, a correlation between BMI and trait anxiety scores was observed in men, although the strength of this correlation was comparatively weaker. These results are in line with the previous reports of low life satisfaction with deviations from healthy body weight. Overweight or obese women significantly expressed low life satisfaction whereas men rated low when they are underweight.<sup>27,28</sup>

The importance of life satisfaction for medical students should not be underestimated, as it greatly affects their general welfare, academic achievements, and prospects in their careers. Numerous factors contribute to life satisfaction, such as individual characteristics, financial situation, physical and mental well-being, career goals, personal achievements, and socio-cultural and environmental circumstances.<sup>4,8</sup> The results of our study notably exhibited gender differences and the impact of stress on medical students. Consistent with our findings, Machul et al., observed that Polish female medical students attained higher scores in life satisfaction compared to their male counterparts.<sup>29</sup> Guney et al., investigated the relationship between depression, anxiety, hope, and life satisfaction in Turkish university students and reported lower satisfaction with high anxiety, however they didn't consider any other factor e.g., gender, smoking, alcohol consumption etc.<sup>30</sup> Individuals who are unsatisfied with their lives are prone to academic, social, and personal problems and addictions of various types in their effort to increase life satisfaction.<sup>26</sup>

Our study bears a range of limitations. It should be reinforced with further studies with similar study groups before the results are generalized as it is cross-sectional. A prospective study with follow-up involving medical students throughout their education would provide more informative insights. However, the primary focus of the present study is to determine whether there is an association between the life satisfaction, sleep quality, and stress levels of medical students. To address this question, we conducted a cross-sectional study encompassing all grades within the faculty. In this context, our results are considered valid, and the methods employed are all validated and reliable. Since the resilience of the individuals is reported to be a protective

factor in preventing risky behaviors,<sup>31</sup> a lack of a resilience scale in our study is another weakness. Lastly, it's important to note that a concept like life satisfaction is quite broad and can be influenced by various confounding factors. As mentioned before, academic level or socio-cultural factors are just a few possible examples. This underscores, once more, the importance of conducting follow-up studies to explore these complexities further.

To the best of our knowledge, this study represents the first investigation exploring the relationship between sleep quality and stress levels, assessed through validated and reliable scales, as well as various biological parameters including heart rate (HR), blood pressure (BP), and salivary cortisol levels, in relation to life satisfaction among medical students. Based on our findings, which indicate that poor sleep quality is associated with higher stress levels, lower life satisfaction, and gender-based differences among medical students, it is crucial to prioritize an action plan aimed at supporting the well-being of these students. This plan should incorporate both physical activities and psychological measures to provide them with essential support, with a particular emphasis on the potential positive impact of peer contributions in encouraging their well-being.<sup>32,33</sup> Medical schools were not only responsible for the continuous improvement of their curricula to keep up with the growing knowledge and changing world to graduate academically equipped doctors, but also follow them for the issues associated with overall well-being and life satisfaction. The improved sleep quality, life satisfaction, and controlled stress of the students can be provided by sufficient care and emotional support of the organizations and families. However, the students themselves should be aware of their condition and pay more attention to their quality of life.

## Summary – Accelerating Translation

**Başlık:** Tıp Fakültesi öğrencilerinin stress düzeyleri uyku kalitesi ve yaşam doyumu ile ilişkilidir

**Çözülmesi Gereken Ana Sorun:** Stres ve uyku problemleri, tıp eğitimi sırasında düşük yaşam tatmini ile ilişkilendirilir ve tıp öğrencilerinin akademik başarılarına ve genel iyilik hallerini olumsuz etkiler. Tıp Fakültesi öğrencileri eğitim yükünün yanısıra, başarı baskısı, kariyer planları, sosyal ve kültürel zorluklarla da başa çıkmaya çalışmaktadırlar. Öğrencilerin büyük çoğunluğu yüksek entelektüel kapasiteye ve çalışma alışkanlığına sahip olsalar da stress ve başa çıkmak zorunda oldukları koşullar öğrencilerin genel iyilik halini etkileyebilmektedir. Bireyin sağlığın etkileyen bir diğer faktör kişinin uyku kalitesidir. Uyku bozuklukları çeşitli hastalıklar ve performans bozuklukları ile ilişkilendirilmiştir. Yaşam doyumu, bireylerin fiziksel ve ruhsal sağlığından, sosyal ve kültürel ortamlarından çeşitli şekillerde etkilenen bir olgudur. Bireyin stress yanıtı ve uyku kalitesi yaşam doyumunu etkileyebilir.

**Çalışmanın Amacı:** Bu çalışmada Hacettepe Üniversitesi Tıp Fakültesi (HÜTF) öğrencilerinin stress düzeylerinin uyku kalitesi (UK) ve yaşam doyumlarına (YD) olan etkilerinin araştırılması amaçlanmıştır.

**Metodoloji:** Bu çalışma 2022 yılının Mayıs-Eylül ayları arasında, etik kurul onayı alındıktan sonra gerçekleştirildi. HÜTF öğrencilerinden çalışma davetine yanıt verenler arasından uygun olan 39 kadın ve 48 erkek

katılımcı, onamları alındıktan sonra, kişisel bilgi formunu, Durumluluk ve Sürekli Kaygı Envanterini (STAI-I ve II), Pittsburgh UK İndeksini (PSQI) ve YD Ölçeğini (SWLS) doldurdu. Katılımcıların kan basınçları (KB), kalp hızları (KH) ölçüldü ve tükürük örnekleri toplandı ELISA yöntemi ile kortizol değerleri saptandı. Sonuçlar istatistiksel olarak analiz edildi.

Sonuçlar: Araştırmaya, farklı sınıflardan 87 tıp öğrencisi (38 kadın ve 49 erkek) katıldı. Katılımcıların demografik ve genel özellikleri benzerdir. Kadın ve erkekler arasında anlık ve durumluluk anksiyete skorları, KB, KH ve tükürük kortizol düzeyleri benzerdi. Uyku kalitesi indeksi, erkeklerde daha kötü uyku kalitesini gösterdi, ancak fark anlamlı değildi. Kadınların yaşam memnuniyeti, erkeklerle karşılaştırıldığında anlamlı şekilde yüksekti. Uyku kalitesi ve yaşam memnuniyeti ile cinsiyet, sigara, alkol ve kafein tüketimi ve stress parametreleri arasındaki ilişkiyi tahmin eden istatistik

modeline göre, uzun süreli stress skorları her iki cinsiyette de kötü uyku kalitesiyle ilişkilendirilmiş, ancak durumluluk skorları sadece erkeklerde anlamlı bir ilişki göstermiştir. Stress düzeyi daha yüksek olan öğrencilerin uyku kalitesinin daha kötü olduğu spatanmıştır. Sonuçlarımız, kadın ve erkeklerde artan kafein tüketimiyle uyku kalitesinin azaldığını, alkol kullanımının etkisinin ise sadece erkeklerde belirgin olduğunu gösterdi. Benzer sonuçlar yaşam memnuniyeti için de elde edildi. Katılımcıların yüksek stress skorları ve kortizol konsantrasyonu, yaşam doyumu ile negatif şekilde ilişkilendirildi.

Çözüm: Farkındalık, bilinçli yaklaşım ve yeterli destek ile tıp fakültesi öğrencilerinin stress düzeylerini azaltmak, uyku ve yaşam kalitelerini arttırmak mümkündür.

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### Author Contributions

Conceptualization: EO, YY, BP. Data Curation: EO, YY. Formal Analysis: YY, BP. Investigation: EO, YY. Methodology: EO, YY, BP. Resources: BP. Supervision: BP. Validation: BP. Writing - Original Draft: EO, YY, BP. Writing - Review Editing: YY, BP.

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