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Physical Activity Levels of Medical Students: A Global Issue to be Addressed

Tıp Fakültesi Öğrencilerinin Fiziksel Aktivite Düzeyleri: Küresel Bir Sorun

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Abstract

Aim: Regular physical activity has been shown to have positive effects on general health, cognitive functions, and mental health. The vast majority of university students do not meet the physical activity recommendations of well-accepted guidelines. In this study, we aimed to determine the physical activity levels (PALs) of medical school students and the related factors.

Material and Method: This is a cross-sectional, observational survey study. The survey was conducted with an online Google survey tool. Five hundred and twenty-eight students who approved the voluntary consent form were included in the study. A questionnaire including sociodemographic data and questions about personal lifestyle were used. The physical activity levels of the participants were determined with the International Physical Activity Questionnaire-short form (IPAQ-SF), depression and anxiety levels were determined with Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI), respectively.

Results: The mean total IPAQ-SF scores of the participants were 1658±1793.91 METs. The PALs of those who had active hobbies and those who participated in regular sports activities were statistically significantly higher (P<0.001, P=0.001, respectively). BDI and BAI scores of those with active hobby were statistically significantly lower than those without (P<0.001; P=0.004, respectively).

Conclusion: In conclusion, having an active hobby and participation in sports activities should be encouraged in order to decrease depression and anxiety scores of medical faculty students.

Keywords: Anxiety, depression, medical students, physical activity

Öz

Amaç: Düzenli fiziksel aktivitenin genel sağlık, bilişsel işlevler ve zihinsel sağlık üzerinde olumlu etkileri gösterilmiştir. Üniversite öğrencilerinin büyük çoğunluğu, kabul görmüş rehberlerin fiziksel aktivite önerilerini karşılamamaktadır. Bu çalışmada tıp fakültesi öğrencilerinin fiziksel aktivite düzeyleri ve ilişkili faktörleri belirlemeyi amaçladık.

Gereç ve Yöntem: Çalışmamız kesitsel ve gözlemsel bir anket çalışmasıdır. Çalışmada çevrimiçi bir Google anket aracı kullanıldı. Gönüllü onam formunu onaylayan beş yüz yirmi sekiz (528) öğrenci çalışmaya dahil edildi. Sosyodemografik verileri ve kişisel yaşam tarzını sorgulayan bir anket kullanıldı. Katılımcıların fiziksel aktivite düzeyleri Uluslararası Fiziksel Aktivite Anketi-kısa formu (IPAQ-SF) ile, depresyon ve anksiyete düzeyleri sırasıyla Beck Depresyon Ölçeği (BDÖ) ve Beck Anksiyete Ölçeği (BAÖ) ile belirlendi.

Bulgular: Katılımcıların ortalama toplam IPAQ-SF puanları 1658±1793,91 MET idi. Aktif hobisi ve düzenli fiziksel aktivite katılımı olanların fiziksel aktivite düzeyleri istatistiksel anlamlılıkla daha yüksekti (sırasıyla, P<0.001, P=0.001). Aktif hobisi olanların BDÖ ve BAÖ skorları olmayanlara göre istatistiksel anlamlılıkla daha düşük saptandı (sırasıyla, P<0.001; P=0.004).

Sonuç: Tıp fakültesi öğrencileri depresyon ve anksiyete düzeylerinin azalmasına yönelik aktif bir hobi edinimi ve spor faaliyetlerine katılım yönünde teşvik edilmelidir.

Anahtar kelimeler: Anksiyete, depresyon, fiziksel aktivite, tıp öğrencisi

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INTRODUCTION

A healthy lifestyle, including regular physical activity (PA), is essential in every stage of life, and the earlier it is gained in life, the more permanent it will be a habit (1). Regular participation in moderate to vigorous-intensity PA has been shown to have positive effects on health in all age groups (2).

The most recent global estimates show that a quarter of adults and the vast majority of adolescents do less than the recommended aerobic exercise (3). This situation is not different among university students. It has been determined that a large percentage of university students do not meet the PA recommendations of well-accepted guidelines (4). University studentship is a particular period of life. After going through a stressful process such as university admission, college students face another difficult process: the transition from adolescence to adulthood. This transition period is one of the most stressful periods in human life, affecting the adoption and maintenance of a healthy lifestyle (5,6). Medical students are among the student groups who have to overcome this difficult process by keeping their mental capacity at the highest level.

In recent years it has been proven that PA has positive effects on mental health and cognitive functions as well as general health (7,8). In its 2020 PA guidelines, World Health Organization (WHO) has made PA recommendations for all age groups and special groups (including pregnant and postpartum women, people with disability or chronic diseases). This updated 2020 guideline provides evidence-based public health recommendations, including the type, intensity, and duration of PA. For young adults and adults (aged 18-64 years), the recommendation is 75-150 minutes of vigorous or 150-300 minutes of moderate-intensity PA per week, or a combination of both (3). WHO also recommends developing and implementing national and subnational policies and programs to protect and improve the health of people of all ages and abilities by maintaining optimal levels of PA and setting PA targets based on national guidelines (3). It should be essential that these guidelines are communicated and key messages are tailored in the appropriate language and format to the target audience. Primary, secondary, and tertiary health professionals, including doctors, nurses, and physical therapists, should play a crucial role in communicating these guidelines to the public and specific groups.

Public health strategies should prioritize programs to enhance physical activity levels (PALs) among university students.

In our study, we aimed to determine the relationship between PALs and the mental health of medical school students and the factors affecting them in order to make appropriate recommendations and provide appropriate conditions to our target audience.

MATERIAL AND METHOD

Data Collection/Recruitment Procedure

This study employed an observational, cross-sectional design and surveyed 528 individuals recruited from university medical students during 15.09.2021-15.12.2021. The survey was conducted with an online Google survey tool. The students invited as participants were all medical school students from first to sixth grade (a total of 1607 students) and were asked whether they wanted to participate in the study freely and voluntarily. Those who chose to click 'yes' were allowed to access the detailed questionnaire. Students who voluntarily confirmed the informed consent form electronically, participated in the survey, and 528 students (first grade: 34, second grade: 66, third grade: 72, fourth grade: 140, fifth grade: 139, sixth grade: 77) who completed the survey were included in the study.

The exclusion criteria were as follows: the presence of neurological and orthopedic diseases that prevent PA, presence of a known psychiatric illness, current use of antidepressants.

Ethical Issues/Statement

All procedures performed in this study were approved by University Clinical Research Ethical Review Board. All participants included in the study signed an online consent form.

Instruments

A questionnaire with sociodemographic data and personal lifestyle-related questions, a structured self-assessment scale of PA, and psychometric scales to determine the level of depression and anxiety were used.

Sociodemographic data contained seven items; gender, age, weight, height, smoking habit, presence of chronic disease, grade year in the faculty. Body mass index (BMI) was expressed in units of kilogram (kg) (weight)/square meter (m2)(height).

Personal lifestyle-related measures were collected by asking questions about the place of residence during the academic year, mode of transportation, presence of active hobbies, status of working in income-generating jobs, engagement in regular sports activity. Engagement in regular sports activity is defined as carried out for the last six months and is done at least once a week. Hobbies that involve movement out of regular sports activities were defined as active hobbies (such as cycling, trekking, dance, camping, etc.).

Participants' level of PA was determined by administering the International Physical Activity Questionnaire (IPAQ). The IPAQ was developed in 1998 to bring PA surveillance to a global standard (9). There are four short and four extended versions of the IPAQ. In this study, we used the 7-item and last 7-day recall version for IPAQ- Short Form (SF). The short form expresses the activity in four different intensities: 1) vigorous-intensity activity such as aerobics, 2) moderate-intensity

activity such as leisure cycling, 3) walking, and 4) sitting (Vigorous-intensity activity is defined as exercise activity that causes the person to breathe much more than normal such as heavy lifting, fast cycling, football, and basketball. Moderate-intensity activity was defined as activities that cause slightly more frequent breathing, such as cycling at normal speed, swimming, and doubles tennis. Activities such as walking for the purpose of transportation from one place to another and walking for hobby purposes are defined as low-intensity activities.). Calculation of the total score of the short form includes the sum of the duration (minutes) and frequency (days) of walking, moderate-intensity activity, and vigorous-intensity activity. The energy required for activities is calculated with the Metabolic Equivalent of Task (MET)-minute score. Standard MET values for specific activities are as follows: sitting=1.5 MET, walking=3.3 MET, moderate PA= 4.0 MET, vigorous PA=8.0 MET. By using these values, daily and weekly PA level is calculated. Category 1 (low PA/inactive): This is the lowest level of PA. Individuals who do not meet the criteria for categories 2 or 3 are considered low/inactive. Category 2 (moderate PA/minimal active): Any one of the following three criteria: 3 or more days of vigorous activity of at least 20 minutes per day OR, five or more days of moderate-intensity activity or walking of at least 30 minutes per day OR, five or more days of any combination of walking, moderate- or vigorous- intensity activities are achieving a minimum of at least 600 MET-min/week. Category 3 (high PA/very active): Any of one of the following two criteria: Vigorous-intensity activity on at least three days and accumulating at least 1500 MET-min/week OR, seven or more days of any combination of walking, moderate- or vigorous-intensity activities achieving a minimum of at least 3000 MET-min/week (10). The Turkish validity and reliability study of the scale was performed by Sağlam et al. in 2010 (11). Participants were compared as those with low PALs (inactive) and those with moderate/high PALs (active).

Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI) were used to evaluate students' depression and anxiety levels, respectively. BDI is a 21-item scale used for the questionnaires on the psychological aspects. Each item is scored between 0-3 and the total score is calculated. BDI scoring was conducted as follows: none or minimal depression < 10, mild to moderate depression (10-18), moderate to severe depression (19-29), and severe depression (30-63) (12). The Turkish validity and reliability study of the scale was performed by Hisli et al. in 1989 (13).

BAI consists of 21 items and is used to measure anxiety levels in adults. For each item, one of the four anxiety levels should be selected on a Likert scale ranging from 0 to 3. BAI scoring was conducted as follows: no anxiety < 8, mild to moderate anxiety (8-15), moderate to severe anxiety (16-25), and severe anxiety (26-63) (14). The reliability and validity study of the Turkish version of all the scale was performed by Ulusoy et al. in 1998 (15).

Statistical Analysis

The statistical analysis was performed using SPSS for IBM version 21 (SPSS Inc. Chicago, IL, USA). The characteristics of the groups with high and low PALs was compared with the Fisher or Chi-square test for categorical data. Numerical data was compared with independent groups t-test or Mann-Whitney U test according to the normal distribution situation. The relationship between anxiety and depression scores and PALs was evaluated by Spearman's correlation tests. P-value < 0.05 was considered significant.

RESULTS

The sample was composed of 528 medical students, 57% of whom were female. Students had a mean age of 22.6 years. Five percent of them were obese, 20% of them were overweight. About half of the students were in the 5th and 6th grades. Approximately one fifth (19.7%) of the participants were smokers and 7% had a diagnosis of chronic disease. The characteristics of the participants, including demographic data, habitual status, and chronic disease, are summarised in **Table 1**.

Table 1. Characteristics of the participants

	n=528
Age (mean ±SD), year	22.58±2.23
Gender, n (%)	
Male	227 (43)
Female	301 (57)
BMI (mean±SD)(kg/m2)	22.9±3.82
BMI group, n (%)	
<18	25 (4.7)
18.1-25	368 (69.7)
25.1-29.9	107 (20.3)
>30	28 (5.3)
Year of the medical faculty, n (%)	
First	34 (6.4)
Second	66 (12.5)
Third	72 (13.6)
Fourth	140 (26.5)
Fifth	139 (26.3)
Sixth	77 (14.6)
Smoking, n (%)	
Yes	104 (19.7)
No	424 (80.3)
Chronic disease, n (%)	
Yes	37 (7)
No	491 (93)

BMI: body mass index

About half of the students (49.4%) had a long-term regular active hobby. Two hundred forty-six students (46.6%) participated in at least one sports activity, including aerobic exercise, fitness, and pilates. The personal lifestyle-related measures and the distribution of sports activities they participate in are demonstrated in **Table 2**.

Table 2. Personal lifestyle-related measures

	n (%)
Residence	
With family	185 (35)
Student dormitory	35 (6.6)
Apartment	308 (58.4)
Mode of transport	
Walking	117 (22.2)
Cycling	7 (1.3)
Public transport	269 (50.9)
Own vehicle	135 (25.6)
Income-generating work	
Yes	18 (3.5)
No	510 (96.5)
Active hobby	
Yes	261 (49.4)
No	267 (50.6)
Licensed athlete	
Yes	22 (4.2)
No	506 (95.8)
Aerobic exercise	
Yes	140 (26.5)
No	388 (73.5)
Fitness	
Yes	136 (25.8)
No	392 (74.2)
Pilates	
Yes	69 (13.1)
No	459 (86.9)

The mean total IPAQ score of students was 1658±1793.91 METs. According to the IPAQ scoring system, 201 (38.1%) students had low PALs, 200 (37.9%) students had moderate PALs, and 127 (24.1%) students had high PALs. The mean PALs of the students were 2012.45±2114.94 and 1487.13±1591.40 for the first three grade students and the last three grade students, respectively. It was statistically significantly lower in the latter group (P=0.004). A weak negative correlation was found between BDI scores and PALs (r=-0.102, P=0.019).

Low-PAL was more common in female students than males (P=0.01). We could not find any correlation between PALs and smoking, BMI category, chronic disease, residence, income-generating work, or mode of transport to campus status. PALs were higher in the students who were interested in a regular active hobby, who engaged in regular sports activity (P < 0.001, P=0.001, respectively) (**Table 3**).

BDI scores were within normal limits in 47.9% of the participants, and BAI scores in 43%. The distribution of depression and anxiety levels of the participants is shown in **Figure 1**.

Female students' mean BAI score was statistically significantly higher than male students' mean BAI score (12.54±9.59 vs. 10.12±8.29, P=0.03). No statistically significant difference was found between the mean BDI scores of the two genders. The mean BDI score was lower in the participants who participated in regular sports activity than those who did not participate in any sports activity, but without statistical significance. The mean BAI score of those who participated in at least one sports activity was significantly lower than those who did not participate in any sports activity (10.56±9.03 vs. 12.32±9.54, P=0.03). The mean BDI and mean BAI scores of the participants who had active hobbies were statistically significantly lower than those who did not (13.60±7.57 vs. 16.46±9.59, P < 0.001; 10.33±8.31 vs. 12.64±10.13, P=0.004; respectively). BDI mean scores of smokers were statistically significantly higher than non-smokers (17.46±8.27 vs. 14.45±8.78, P=0.001).

Table 3. The comparison of the variables between low and moderate/high PAL groups

	Low PAL	Moderate/ High PAL	P value
Gender, n (%)			
Female	128 (63.7)	173 (52.9)	*0.010
Male	73 (36.3)	154 (47.1)	
Smoking, n (%)			
Yes	40 (19.9)	64 (19.6)	0.506
No	161 (80.1)	263 (80.4)	
Chronic disease, n (%)			
Yes	16 (8)	21 (6.4)	0.489
No	185(92)	306 (93.6)	
Residence, n (%)			
With family	78 (38.8)	107 (32.7)	
Student dormitory	17 (8.5)	18 (5.5)	0.096
Apartment	106(52.7)	202 (61.8)	
Mode of transport, n (%)			
Walking	45 (22.4)	72 (22)	
Cycling	0	7 (2.1)	0.225
Public transportation	104 (51.7)	165 (50.5)	
Own vehicle	52 (25.9)	83 (25.4)	
Licensed athlete, n (%)			
Yes	4 (2)	18 (5.5)	*0.037
No	197 (98)	309(94.5)	
Income-generating work, n (%)			
Yes	4 (2)	14 (4.3)	0.121
No	197 (98)	313 (95.7)	
Active hobby, n (%)			
Yes	74 36.8)	187(57.2)	***0.001
No	127 (63.2)	140 (42.8)	
Aerobic exercise, n (%)			
Yes	38 (18.9)	102 (31.2)	**0.001
No	163 (81.1)	225 (68.8)	
Fitness, n (%)			
Yes	22 (10.9)	114 (34.9)	***0.001
No	179 (89.1)	213 (65.1)	
Pilates, n (%)			
Yes	18 (9)	51 (15.6)	*0.018
No	183 (91)	276 (84.4)	
Sports activity, n (%)			
Yes	64 (31.8)	182 (55.7)	***0.001
No	137 (68.2)	145 (44.3)	
BMI, n (%)			
≤25 kg/m2	151 (75.1)	242 (74)	0.429
>25 kg/m2	50 (24.9)	85 (26)	

PAL: physical activity level; BMI: body mass index;

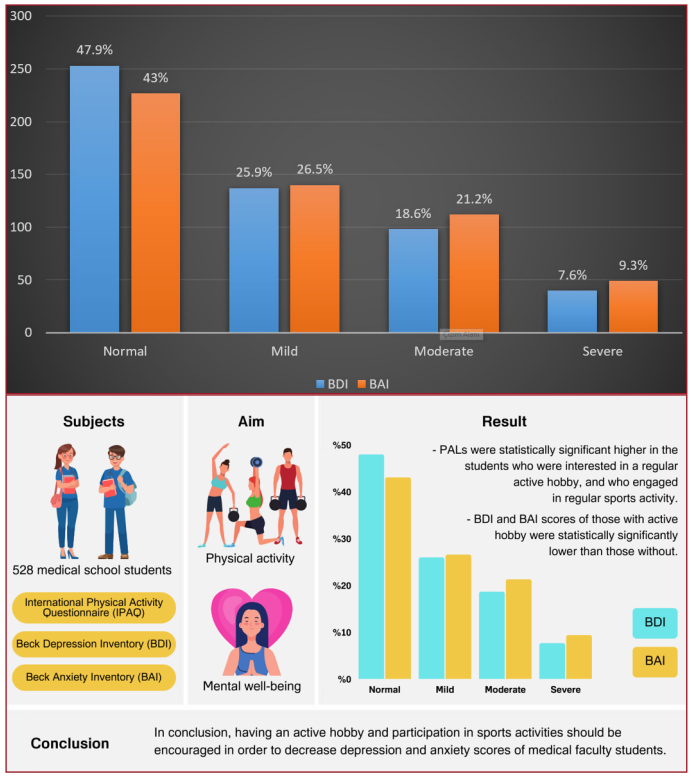

Figure 1. Distribution of participants according to depression and anxiety categories

DISCUSSION

This study aimed to evaluate the PALs of medical school students and the related factors. We found that more than half of 528 medical students had moderate or high PALs. The PALs of female students were lower. PALs were higher in the students who engaged in a regular active hobby or regular sports activity. Having an active hobby and engaging in regular sports activities were associated with lower anxiety and depression scores.

The inactivity levels (38.1%) of the students in our study were consistent with the literature. Studies have shown that a high percentage of university students are physically inactive (40-50%) and do not meet the recommendations of well-accepted PA guidelines (4,16,17). It has been shown that university students are less active than children and adolescents. This was attributed to not allocating enough time to PA due to academic success anxiety (18,19).

The benefits of PA on general health at all ages have been well established, and its positive effects on the brain and mental health have also been demonstrated (20,21). Both acute and regular physical activities have been shown to increase cognitive function and improve mood and mental health (8,22). Regular PA has been associated with reduced levels of depression and anxiety (23,24).

The prevalence rates of anxiety and depression among medical school students were reported as 7.7-65.5% and 6-66%, respectively (25,26). Similarly, another systematic review revealed that depressive symptoms could reach up to 50% among university youth in some countries, and the rates of depression decrease as the grade of class increases (27). This was attributed to the increase in students' coping capacity as they acclimatized to the academic environment. Anxiety and depression rates were 57% and 52.1%, respectively, among our participant students. Although it did not coincide with the lockdown period, the students' BDI and BAI scores may be higher than expected since they were in the Covid-19 pandemic period. Consistent with the literature, a decrease in depression and anxiety scores were detected with the increase in grades.

The effect of acute PA on cognitive functions is dose-dependent (in terms of amount and intensity) (28). It is still impossible to say a similar conclusion with the same certainty for regular PA (29,30). Studies have generally investigated the effects of regular PA on cognitive functions and depression in terms of amount (8,29). In a recent study conducted with young adults, which also evaluated depression and anxiety levels, it was revealed that the frequency of regular moderate to vigorous PA was associated with better mental health (8). According to the results of our study, there was not a strong correlation between PA intensity and depression and anxiety scores.

Among the participants in our study, PALs were higher in those who had active hobbies and regular exercise participation. Physical practice activities have been discussed in many of the studies investigating the leisure and extracurricular activities of university youth. It is suggested that this dominance is due to the ease of quantitative measurement of PA in terms of time and intensity and the positive effects of PA on health (31). A study involving 360 medical students determined that 53.9 % of the students participated in extracurricular activities, and participation in extracurricular activities was associated with a low prevalence of burnout, regardless of the chosen activity (32). BDI and BAI scores of our participants were lower in those who had a long-term active hobby (49.4 %) and participation in at least one sports activity (46.6%), but without statistical significance in the BDI scores of those who participated in at least one sports activity.

Many studies have shown that males have higher moderate to vigorous-intensity PALs among college youth than females (18,33). The participation rate of females in outdoor activities in all age groups, including childhood and adolescence, is generally lower than that of males. In addition, it has been shown that women spend less time on moderate-to-vigorous sports activities (34-36). Although the participation rates of our female students in outdoor and sports activities were not different from our male students, their PALs were found to be lower, probably due to the less time they allocate to moderate-vigorous sports activities like the general population.

The relationship between PA and obesity in children differs according to age groups (37). However, studies show a relationship between obesity and low PALs in adults and the elderly (38,39). In our study, no relationship was found

between PALs and BMI. We found the average MET scores of the students in the first three grades to be higher than the students in the last three grades, but we did not detect a relationship between PALs and years of medical school.

In our study, we used IPAQ-SF to determine the participants' PALs. Studies have shown no difference between IPAQ-SF and IPAQ-LF in terms of validity and reliability, and the short form is also feasible to apply. The original authors recommend the "last 7-day recall" version of the IPAQ-SF for PA surveillance studies so that participants have a low burden of reporting activity (10). However, it has been shown that compared to objective devices, IPAQ-SF tends to overestimate PALs than they actually are (40).

Study Limitations

First, we kept the survey questions low and short in order not to bore the participants and to ensure that they did not leave the survey unfinished, considering the other forms that the participants had to fill out. The use of a self-administered questionnaire to assess physical activity is the second limitation of our study.

CONCLUSIONS

It is a global problem that the physical activity levels of university students are lower than recommended. According to our results, participation in sports activities and active hobbies have positive effects on mental health and PALs. Having an active hobby and participation in sports activities should be encouraged in order to decrease depression and anxiety scores of medical faculty students.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Suleyman Demirel University Clinical Research Ethical Review Board (Date: 16.07.2021, Decision No: 72867572-050.01.04-84732).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The author has no conflicts of interest to declare.

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