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PERCEIVED EXERCISE BENEFITS AND BARRIERS IN ACTIVE AND INACTIVE UNIVERSITY STUDENTS

ORIGINAL ARTICLE

ABSTRACT

Purpose: The aims of this study were to compare the perceived benefits and barriers to exercise in active and inactive university students and to determine the relationship between physical activity level and perceived benefits/barriers in university students.

Methods: The undergraduate students were invited to this cross-sectional survey. A total of 526 students responded to the online survey consisting of the International Physical Activity Questionnaire (IPAQ) and Exercise Benefits/Barriers Scale (EBBS). The participants were divided into two groups: the active group (n=341) and the inactive group (n=185) based on IPAQ.

Results: The most agreed benefit was the item "exercise improves the way my body looks," whereas the most agreed barrier was the item "exercise tires me". Comparison of the active and inactive groups showed that the active group perceived the benefits of exercise higher than the inactive group, especially in terms of life enhancement, physical performance, and psychological outlook ($p<0.05$). The inactive group perceived more barriers to exercise than the active group, especially in terms of exercise milieu and physical exertion ($p<0.05$). Moreover, the total physical activity level was positively associated with exercise benefits, especially psychological outlook, while negatively related to barriers, especially exercise milieu and physical exertion ($p<0.001$).

Conclusion: The physical activity participation of university students can be encouraged by increasing their knowledge and perception of the benefits of exercises and by decreasing the barriers that they felt. Therefore, this study's results may contribute to planning interventions and strategies aiming to promote physical activity participation among university students.

Key Words: Barrier, Benefit, Exercise, Physical Activity, Student.

AKTİF VE AKTİF OLMAYAN ÜNİVERSİTE ÖĞRENCİLERİNDE ALGILANAN EGZERSİZ YARARLARI VE ENGELLERİ

ARAŞTIRMA MAKALESİ

ÖZ

Amaç: Bu çalışmanın amaçları, aktif ve aktif olmayan üniversite öğrencilerinde algılanan egzersiz yararları ve engellerini karşılaştırmak ve üniversite öğrencilerinde fiziksel aktivite düzeyi ile algılanan egzersiz yararları ve engelleri arasındaki ilişkiyi belirlemekti.

Yöntem: Bu kesitsel araştırmaya lisans öğrencileri davet edildi. Uluslararası Fiziksel Aktivite Anketi'ni (UFAA) ve Egzersiz Yararları/Engelleri Ölçeği'ni (EYEÖ) içeren çevrimiçi anketi toplam 526 öğrenci cevapladı. Katılımcılar UFAA'ya göre aktif (n=341) ve aktif olmayan grup (n=185) olmak üzere iki gruba ayrılarak değerlendirildi.

Sonuçlar: Üniversite öğrencileri tarafından en çok algılanan yarar "egzersiz vücut görünümümü geliştirme yoludur", en çok karşılaşılan engel ise "egzersizden yoruluyorum" idi. Aktif ve aktif olmayan grupların karşılaştırılması, aktif grubun özellikle yaşam iyileştirme, fiziksel performans ve psikolojik bakışa dair egzersizin faydalarını aktif olmayan gruptan daha yüksek algıladığını ($p<0,05$), aktif olmayan grubun ise özellikle egzersiz ortamı ve fiziksel efora dair engelleri aktif gruptan daha fazla algıladığını göstermiştir ($p<0,05$). Ayrıca, toplam fiziksel aktivite düzeyi özellikle psikolojik bakış olmak üzere egzersiz yararları ile pozitif ilişkili iken, egzersiz ortamı ve fiziksel efora dair engeller ile negatif ilişkiliydi ($p<0,001$).

Tartışma: Üniversite öğrencilerinin fiziksel aktivite katılımları, egzersizlerin faydalarına ilişkin bilgi ve algıları artırılarak ve hissettikleri engeller azaltılarak teşvik edilebilir. Bu nedenle, bu çalışmanın sonuçları, üniversite öğrencileri arasında fiziksel aktivite katılımını teşvik etmeyi amaçlayan müdahalelerin ve stratejilerin planlanmasına katkıda bulunabilir.

Anahtar Kelimeler: Bariyer, Yarar, Egzersiz, Fiziksel Aktivite, Öğrenci.

INTRODUCTION

Physical activity prevents many chronic diseases and improves both physical and psychological health (1). However, it is estimated that 31% of adults worldwide are physically inactive (2). The World Health Organization (WHO) reported that inactivity has become widespread, and about 3.2 million deaths per year are associated with physical inactivity. For this reason, physical inactivity has also been defined as a global public health problem (3). Therefore, increasing physical activity is among the priorities for public health worldwide (4).

Physical activity habit is generally developed during childhood and young adulthood. It has been reported that there is a significant decrease in the physical activity level of students in the transition from high school to university (5). The university period is precious for the development of physical activity habits, as it is a period when individuals start to make their own decisions and develop lifelong habits according to their preferences (6).

The studies conducted in many different countries have shown that university students' physical activity levels are generally low (6-11). Many studies among university students have shown that there are many different barriers to exercise, primarily the lack of time, lack of motivation, and tiredness (7-16). However, it is not yet clear which motivating factors lack inactive students and encourage exercise in physically active students.

The studies generally focused on barriers to exercise from inactive students' perspective (7-9,12,13,16). As well as barriers to exercise, lack of motivating factors may also be responsible for inactivity, insomuch that motivating factors encouraging active students can be useful tools to overcome barriers (17). One of the primary motivation sources for exercise is to know the benefits of exercise and to perceive these benefits at a high level. Therefore, investigating both perceived benefits and barriers to exercise in active and inactive university students will better understand the physical inactivity in university students (18). In this way, it may be possible to develop beneficial interventions to promote physical activity in university students.

This study's primary aim is to compare the perceived exercise benefits/barriers in active and inactive university students. The secondary aim is to determine the relationship between physical activity level and perceived benefits/barriers in university students.

METHODS

Participants

The study protocol was approved by the Gazi University Ethics Commission (No: 2020-371, date: July 14, 2020). The undergraduate students at Gazi University were invited to this cross-sectional survey. The surveys were prepared using Google forms, and the relevant link was sent to 625 students. The students read the informed consent form on the first page, and 563 volunteer students agreed to participate in the survey. Thirty-seven students with chronic disease were excluded. The data were collected between 17 and 21 July 2020. This date range was in the normalization process when the Coronavirus disease (COVID-19) pandemic was ongoing, but restrictions were minimal, and there were no restrictions that prevent physical activity, such as curfews and closure of the gym in Turkey.

The sample size was calculated based on the difference between barrier scores in active and inactive students declared by the study of Blake et al. (8). The total sample size was estimated at a minimum of 458 using the power analysis software (G*Power 3.1.9.2) to achieve 99% power with a two-sided level of 5% (19).

Measurements

The survey consisted of three parts: demographic information, International Physical Activity Questionnaire (IPAQ), and the Exercise Benefits/Barriers Scale (EBBS). The physical activity level was assessed using the Short Form of IPAQ (20, 21). The IPAQ measures vigorous-intensity activity, moderate-intensity activity, and walking activity levels by calculating physically active time regarding the number of days and average time per day in the last seven days. Scores are calculated for walking, moderate-intensity activities, and vigorous-intensity activities using the following formulas: walking MET-minutes/week=3.3 x walking minutes x walking days; moderate MET-minutes/week=4.0xmoderate-intensity activity minutes x moderate days;

vigorous MET-minutes/week=8.0 x vigorous-intensity activity minutes x vigorous-intensity days. The activity levels are represented as a Metabolic Equivalent of Tasks (METs) which is the energy expended during sitting at rest. The total score of IPAQ indicates a low physical activity of fewer than 600 MET-minutes per week, moderate physical activity of more than 600 MET-minutes per week, and a high level of physical activity of more than 3000 MET-minutes per week. The lowest score is "0", and the score increases as the activity time increases.

In this study, the participants who met the following criteria, which is three or more days of vigorous activity of at least 20 min per day, or five or more days of moderate-intensity activity or walking at least 30 min per day, or any combination of walking, moderate-intensity and vigorous-intensity activities achieving a minimum of 600 MET-min/week were considered as active. Those not meeting these criteria were considered inactive (21). Thus, the participants were assigned to the active group (n=341) and the inactive group (n=185) based on IPAQ.

The EBBS assessed perceived exercise benefits and barriers. The benefit component consisted of 29 items categorized into five subscales: life enhancement, physical performance, psychological outlook, social interaction, and preventative health (22,23). The barrier component consisted of 14 items categorized into four subscales: exercise milieu, time expenditure, physical exertion, and family discouragement. The scales are scored based on a 4-point Likert scale: "4"strongly agree, "3" agree, "2" disagree, and "1" strongly disagree. The benefit subscales scores may range between 29 to 116, and the barrier subscales scores may range between 14 and 56. A higher score indicates a greater perception of benefits or barriers to exercise.

The permissions were obtained for using Turkish versions of both questionnaires, and Turkish versions of the questionnaires were used in this study (20, 23).

Statistical analysis

Statistical analysis was performed by using the IBM Statistics SPSS v21.0. (IBM Corp. Armonk. NY, USA). Kolmogorov–Smirnov test was used to assess the normality of the sample's distribution. Due to non-normal distribution, a Mann-Whitney U test was used to compare the values between the two groups, and the statistical significance level was $p<0.05$. Categorical variables were expressed as percentages. A Spearman correlation coefficient was performed to decide the factors associated with all participants' physical activity levels. The correlation coefficient was classified as negligible (0-0.10), weak (0.10-0.39), moderate (0.40-0.69), strong (0.70-0.89), and very strong (0.90-1.00) (24).

RESULTS

Five hundred sixty-three students answered the survey; however, 37 students with chronic diseases were excluded. A total of 526 students (age: 21.66±2.98) were included in this study. The post hoc power analysis showed the statistical power of 83% for the difference between the barrier scores of EBBS in active and inactive students.

Most of the participants were female (81%), did not smoke (90.3%), and were studying at the faculty of health sciences (71.7%). Participants were divided into active (n=341, 64.8%) and inactive groups (n=185, %35.2) based on IPAQ scores. There was no difference between the demographic characteristics of the two groups. The demographic characteristics and physical activity levels of the participants are shown in Table 1.

Difference between active and inactive university students

Table 2 shows exercise benefits and barriers in active and inactive groups. Expectedly, the groups' comparison showed that the active group perceived more benefits and fewer barriers to exercise than the inactive group ($p<0.05$). In perceived benefits items, both groups' median values were 3-4, except the item "exercising increases my acceptance by others". In other words, the majority in both groups replied "strongly agree" or "agree" to all items regarding the benefits of exercise. In all participants, the most agreed benefit was the item "exercise improves the way my body looks," whereas the least agreed benefit was the item "exercising increases my acceptance by others". In the life enhancement subscale, the active group had a higher perception of benefits regarding the fol-

lowing items: "exercising helps me sleep better at night, exercise helps me decrease fatigue, exercising improves my self-concept, exercising increases my mental alertness, exercise allows me to carry out normal activities without becoming tired, and exercise improves the quality of my work" ($p<0.05$). In the physical performance subscale, the active group had a higher perception of benefit regarding the following items: "exercising increases my level of physical fitness, my muscle tone is improved with exercise, exercising improves the functioning of my cardiovascular system, exercise increases my stamina, exercise improves my flexibility, and my physical endurance is improved by exercising" ($p<0.05$). In the psychological outlook subscale, the active group had a higher perception of benefit regarding the following items: "I enjoy exercise, exercise decreases feelings of stress and tension for me, exercise improves my mental health, exercise gives me a sense of personal accomplishment, exercising makes me feel relaxed, and I have improved feelings of well-being from exercise" ($p<0.05$). In the social interaction subscale, the active group had a higher perception of benefit in only one item, "exercise is good entertainment for me" ($p<0.05$). In addition, there was no difference between the perception of benefit about preventive health in the two groups ($p>0.05$). In all participants, the most agreed barrier was the item "exercise tires me" whereas the least agreed barrier was the item "I think people in exercise clothes look funny". In the exercise milieu subscale, the active group had less perception of barriers regarding the following items: places for me to exercise are too far away, I am too embarrassed to exercise, it costs too much money to exercise, and there are too few places for me to exercise ($p<0.05$). On the other hand, there was no difference in the time expenditure subscale between the two groups ($p>0.05$). In the physical exertion subscale, the active group had less perception of barriers regarding the following items: "exercise tires me, I am fatigued by exercise, and exercise is a hard work for me". Lastly, in the family discouragement subscale, the active group had less perception of barriers in only one item: "my spouse/significant other does not encourage exercising" ($p<0.05$).

Table 1: Demographic Characteristics of Participants.

Variables	Inactive Group (n=185)	Active Group (n=341)	p
Age (years)	21 (20-22)	21 (20-22)	0.984
Gender			
Female	155 (83.20%)	271 (79.50%)	0.246
Male	30 (16.20%)	70 (20.50%)	
BMI (kg/m²)	21.77 (19.37-23.44)	21.63 (19.69-23.75)	0.438
Year at University			
Freshman	38 (20.50%)	70 (20.50%)	0.066
Sophomore	46 (24.90%)	76 (22.30%)	
Junior	44 (23.80%)	116 (34%)	
Senior	57 (30.80%)	79 (23.20%)	
Smoking			
Yes	21 (11.40%)	30 (8.80%)	0.357
No	164 (88.60%)	311 (91.20%)	
Physical Activity Level (METs-minutes per week)			
Vigorous	0 (0-80)	480 (160-900)	**<0.001***
Moderate	40 (0-120)	360 (140-540)	**<0.001***
Walking	99 (0-198)	462 (247.50-742.50)	**<0.001***
Total	297 (132-438)	1314 (922-2076)	**<0.001***

*p<0.05. Data are presented as frequency (%)or median (IQR). Mann-Whitney U Test. BMI: Body Mass Index, METs: Metabolic Equivalent of Tasks.

Table 2: Exercise Benefits and Barriers in Active and Inactive Groups.

Exercise Benefits and Barriers	All students (n=526)		Inactive Group (n=185)		Active Group (n=341)		p
	Mean±SD	Median (IQR)	Mean±SD	Median (IQR)	Mean±SD	Median (IQR)	
Exercise Benefits							
Life Enhancement (1-4)	25.24±5.14	25 (23-30)	24.50±4.90	24 (22-29)	25.65±5.23	25 (23-30)	**0.001***
My disposition is improved by exercise	2.82±0.91	3 (2-4)	2.77±0.87	3 (2-3)	2.85±0.94	3 (2-4)	0.235
Exercising helps me sleep better at night	3.26±0.80	3 (3-4)	3.17±0.77	3 (3-4)	3.32±0.81	3 (3-4)	**0.007***
Exercise helps me decrease fatigue	2.84±0.89	3 (2-4)	2.74±0.81	3 (2-3)	2.91±0.93	3 (2-4)	**0.021***
Exercising improves my self-concept	3.15±0.80	3 (3-4)	3.06±0.82	3 (3-4)	3.21±0.79	3 (3-4)	**0.038***
Exercising increases my mental alertness	3.32±0.73	3 (3-4)	3.23±0.70	3 (3-4)	3.38±0.74	3 (3-4)	**0.005***
Exercise allows me to carry out normal activities without becoming tired	3.29±0.75	3 (3-4)	3.19±0.72	3 (3-4)	3.35±0.77	3 (3-4)	**0.004***
Exercise improves the quality of my work	3.29±0.73	3 (3-4)	3.17±0.69	3 (3-4)	3.36±0.75	3 (3-4)	**<0.001***
Exercise improves overall body functioning for me	3.23±0.75	3 (3-4)	3.16±0.74	3 (3-4)	3.28±0.76	3 (3-4)	0.057
Physical Performance (1-4)	27.66±4.45	29 (25-31)	27.15±4.11	27 (25-31)	27.93±4.61	30 (25-32)	**0.003***
Exercise increases my muscle strength	3.46±0.70	4 (3-4)	3.44±0.65	4 (3-4)	3.48±0.73	4 (3-4)	0.161
Exercising increases my level of physical fitness	3.40±0.72	4 (3-4)	3.38±0.68	3 (3-4)	3.48±0.75	4 (3-4)	**0.025***
My muscle tone is improved with exercise.	3.40±0.73	4 (3-4)	3.35±0.68	3 (3-4)	3.43±0.77	4 (3-4)	**0.035***
Exercising improves functioning of my cardiovascular system	3.44±0.73	4 (3-4)	3.38±0.69	3 (3-4)	3.47±0.75	4 (3-4)	**0.030***
Exercise increases my stamina	3.43±0.70	4 (3-4)	3.37±0.67	3 (3-4)	3.48±0.72	4 (3-4)	**0.013***
Exercise improves my flexibility	3.44±0.70	4 (3-4)	3.37±0.67	3 (3-4)	3.48±0.72	4 (3-4)	**0.016***
My physical endurance is improved by exercising	3.21±0.78	3 (3-4)	3.06±0.80	3 (3-4)	3.29±0.78	3 (3-4)	**0.001***
Exercise improves the way my body looks	3.80±0.39	4 (4-4)	3.79±0.41	4 (4-4)	3.82±0.38	4 (4-4)	0.373
Psychological Outlook (1-4)	19.84±3.84	20 (18-23)	19.09±3.56	19 (18-22)	20.25±3.93	21 (18-24)	**<0.001***
I enjoy exercise	3.19±0.73	3 (3-4)	3.00±0.64	3 (3-3)	3.30±0.76	3 (3-4)	**<0.001***
Exercise decreases feelings of stress and tension for me	3.32±0.71	3 (3-4)	3.18±0.67	3 (3-4)	3.40±0.73	4 (3-4)	**<0.001***
Exercise improves my mental health	3.37±0.72	3 (3-4)	3.28±0.69	3 (3-4)	3.43±0.73	4 (3-4)	**0.002***
Exercise gives me a sense of personal accomplishment	3.38±0.73	4 (3-4)	3.25±0.74	3 (3-4)	3.45±0.73	4 (3-4)	**0.001***
Exercising makes me feel relaxed	3.32±0.75	3 (3-4)	3.22±0.76	3 (3-4)	3.38±0.75	4 (3-4)	**0.006***
I have improved feelings of wellbeing-from exercise	3.24±0.75	3 (3-4)	3.15±0.73	3 (3-4)	3.29±0.76	3 (3-4)	**0.011***
Social Interaction (1-4)	10.89±2.64	11 (9-12)	10.63±2.49	10 (9-12)	11.03±2.71	11 (9-13)	0.060
Exercising lets me have contact with friends and persons I enjoy	2.65±0.90	3 (2-3)	2.62±0.87	3 (2-3)	2.67±0.92	3 (2-3)	0.523
Exercising is a good way for me to meet new people	2.77±0.86	3 (2-3)	2.73±0.84	3 (2-3)	2.80±0.88	3 (2-3)	0.209
Exercise is good entertainment for me	3.11±0.79	3 (3-4)	2.99±0.74	3 (3-3)	3.19±0.82	3 (3-4)	**0.001***
Exercising increases my acceptance by others	2.34±0.92	2 (2-3)	2.29±0.87	2 (2-3)	2.37±0.96	2 (2-3)	0.440
Preventive Health (1-4)	9.71±1.94	9 (9-11)	9.55±1.84	9 (9-11)	9.80±1.99	10 (9-12)	0.053
I will prevent heart attacks by exercising	3.28±0.71	3 (3-4)	3.23±0.69	3 (3-4)	3.32±0.72	3 (3-4)	0.051
Exercising will keep me from having high blood pressure	3.30±0.72	3 (3-4)	3.25±0.69	3 (3-4)	3.34±0.74	3 (3-4)	0.060
I will live longer if I exercise	3.11±0.83	3 (3-4)	3.07±0.77	3 (3-4)	3.13±0.87	3 (3-4)	0.162
Total Score (29-116)	93.33±16.09	94 (85-107)	90.92±15.01	88 (83-104)	94.65±16.53	96 (86-108)	**<0.001***
Exercise Barriers							
Exercise Milieu (1-4)	11.51±3.31	12 (9-13)	12.05±3.25	12 (10-14)	11.22±2.71	11 (9-13)	**0.005***

Places for me to exercise are too far away	2.06±0.80	2 (2-2)	2.18±0.82	2 (2-3)	1.99±0.79	2 (1-2)	**0.011***
I am too embarrassed to exercise	1.73±0.78	2 (1-2)	1.85±0.80	2 (1-2)	1.67±0.77	2 (1-2)	**0.009***
It costs too much money to exercise	1.76±0.76	2 (1-2)	1.84±0.76	2 (1-2)	1.72±0.76	2 (1-2)	**0.047***
Exercise facilities do not have convenient schedules for me	2.07±0.80	2 (2-3)	2.14±0.75	2 (2-3)	2.04±0.83	2 (1-2)	0.100
I think people in exercise clothes look funny	1.63±0.72	2 (1-2)	1.69±0.73	2 (1-2)	1.60±0.73	1 (1-2)	0.135
There are too few places for me to exercise	2.24±0.90	2 (2-3)	2.36±0.89	2 (2-3)	2.19±0.91	2 (2-3)	**0.032***
Time Expenditure (1-4)	5.82±1.68	6 (5-7)	5.82±1.60	6 (5-7)	5.82±1.73	6 (4-7)	0.996
Exercising takes too much of my time	2.18±0.69	2 (2-3)	2.19±0.66	2 (2-3)	2.18±0.72	2 (2-3)	0.646
Exercise takes too much time from family relationships	1.73±0.73	2 (1-2)	1.68±0.72	2 (1-2)	1.77±0.75	2 (1-2)	0.136
Exercise takes too much time from my family responsibilities	1.89±0.79	2 (1-2)	1.95±0.79	2 (1-2)	1.86±0.80	2 (1-2)	0.197
Physical Exertion (1-4)	7.11±1.99	7 (6-8)	7.55±1.86	8 (6-9)	6.88±2.03	7 (6-8)	**<0.001***
Exercise tires me	2.53±0.79	3 (2-3)	2.69±0.74	3 (2-3)	2.46±0.82	2 (2-3)	**0.003***
I am fatigued by exercise	2.46±0.79	3 (2-3)	2.62±0.73	3 (2-3)	2.37±0.81	2 (2-3)	**0.001***
Exercise is hard work for me	2.11±0.83	2 (2-3)	2.24±0.81	2 (2-3)	2.04±0.84	2 (1-2)	**0.004***
Family Discouragement (1-4)	4.04±1.50	4 (3-5)	4.24±1.45	4 (3-5)	3.93±1.52	4 (3-5)	**0.012***
My spouse (or significant other) does not encourage exercising	1.92±0.82	2 (1-2)	2.05±0.81	2 (1-3)	1.85±0.82	2 (1-2)	**0.002***
My family members do not encourage me to exercise	2.11±0.89	2 (1-3)	2.19±0.83	2 (2-3)	2.08±0.92	2 (1-3)	0.099
Total Score (14-56)	28.48±6.69	28 (24-32)	29.65±6.27	30 (26-33)	27.85±6.84	28 (23-32)	**0.001***

*p<0.05. Mann-Whitney U Test. IQR: Interquartile Range.

Relationship between physical activity levels and perceived benefits and barriers

Table 3 shows the relationship between physical activity levels and perceived benefits/barriers in all participants. Life enhancement was positively and weakly correlated with vigorous-intensity physical activity, walking, and total physical activity level (p<0.05, Table 3). Physical performance was positively and weakly correlated with moderate-intensity, walking, and total physical activity (p<0.05, Table 3). The psychological outlook was positively and weakly correlated with vigorous intensity, moderate intensity, walking and total physical activity (p<0.05, Table 3). However, social interaction and preventive health were not correlated with physical activity levels (p>0.05, Table 3).

Between physical activity levels and the perceived barriers, exercise milieu was negatively and weakly correlated with vigorous, moderate, and total physical activity level (p<0.05, Table 3). Physical exertion was negatively and weakly correlated with walking, vigorous, and total physical activity level (p<0.05, Table 3). Family discouragement was negatively and weakly correlated with total physical activity level (p<0.05, Table 3), although time expenditure was not correlated with physical activity level (p>0.05, Table 3).

DISCUSSION

This study showed that active university students perceived the exercise benefits higher than the inactive group, especially in terms of life enhancement, physical performance, and psychological outlook. On the other hand, the inactive group perceived more barriers to exercise than the active group, especially in terms of exercise milieu and physical exertion. In addition, the correlation analyses revealed that the total physical activity level was positively but weakly related to perceived exercise benefits while it was negatively and weakly related to the perceived barriers to exercise.

Current physical activity guides for adults recommend performing at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity exercise, or a combination of both per week (25). However, in this study, 35.2% of the university students had a low physical activity level, while 64.8%

Table 3: Relationship between Physical Activity Levels and Perceived Benefits/Barriers.

Exercise Benefits and Barriers		Physical Activity Level			
		Vigorous	Moderate	Walking	Total
Exercise Benefits					
Life Enhancement	**r**	0.112	0.059	0.111	0.127
	p	**0.010***	0.179	**0.011***	**0.004***
Physical performance	**r**	0.070	0.105	0.112	0.130
	p	0.107	**0.016***	**0.010***	**0.003***
Psychological Outlook	**r**	0.161	0.156	0.153	0.212
	p	**<0.001***	**<0.001***	**<0.001***	**<0.001***
Social Interaction	**r**	0.070	0.003	0.036	0.059
	p	0.111	0.947	0.404	0.178
Preventive Health	**r**	0.055	0.009	0.036	0.043
	p	0.206	0.833	0.406	0.328
Exercise Barriers					
Exercise Milieu	**r**	-0.134	-0.115	-0.073	-0.160
	p	**0.002***	**0.008***	0.095	**<0.001***
Time Expenditure	**r**	0.028	-0.037	-0.007	0.001
	p	0.527	0.400	0.880	0.991
Physical Exertion	**r**	-0.118	-0.080	-0.145	-0.160
	p	**0.007***	0.068	**0.001***	**<0.001***
Family Discouragement	**r**	-0.050	-0.076	-0.071	-0.118
	p	0.248	0.083	0.102	**0.007***

*p<0.05. Spearman rank correlation coefficient.

had moderate (56.8%) to high (8%) physical activity level. In the previous study, Savci et al. reported that university students' physical activity levels in Turkey were as follows: 15% low, 68% moderate, and 18% high physical activity (26). Due to the COVID-19 pandemic, the restrictions were declared in Turkey in March 2020, and the normalization process started in June 2020. Although there were no restrictions such as curfews or the gym's closure that would affect the students' physical activities, the effects of the pandemic were ongoing on the days when the survey was answered. Therefore, the COVID-19 pandemic may have led to a higher proportion of students with low physical activity levels in this study.

Promoting physical activity is an essential need among university students. Murphy et al. investigated the relationship between physical activity and psychosocial factors in university students in Ireland, and they found that the increase in motivation promoted physical activity (27). The best method of motivation to increase physical activity may be increased awareness about the exercise benefits. Therefore, as the perceived benefits increase, an increase in the individual's physical activity is expected. This study demonstrated that the active group perceived higher exercise benefits than the inactive group in line with these expectations. To our knowledge, the differences between perceived exercise benefits in active and inactive university students have not been investigated to date. Interestingly, in this study, most inactive groups replied "strongly agree" or "agree" to items regarding the exercise benefits like the active group. In other words, the main difference between the two groups was due to the difference in the level of positive perception about exercise benefits rather than knowing these benefits. Most of the students participating in this study were studying in the faculty of health sciences. Therefore, most of the participants may already have sufficient information about exercise benefits through courses. Since the active group performed vigorous-intensity or mod-

erate-intensity exercise, their perceptions of exercise benefits were based not only on information but also on experience. In other words, as physical activity levels increase through performing exercise, positive perceptions about exercise benefits may have increased in participants.

This study demonstrated that the university students agreed the most with "exercise improves the way my body looks", whereas they agreed the least with "exercising increases my acceptance by others". Similarly, Lovell et al. examined perceived exercise benefits among non-exercising female university students in the United Kingdom. They showed that the participants agreed the least with "exercising increases my acceptance by others" while agreeing the most with "exercising increases my level of physical fitness". Moreover, the most perceived benefit was physical performance followed by the benefits of psychological outlook, preventive health, life enhancement, and then social interaction (11).

Moreover, the results of correlation analyses in this study showed that the total physical activity level was positively related to the following benefits: psychological outlook, life enhancement, and physical performance. In addition, the total physical activity level was not related to the exercise benefit in terms of preventive health in this study. The exclusion of students with chronic disease may have caused this result.

In all participants of this study, the most agreed barriers were the items "exercise tires me", followed by "I am fatigued by exercise", and "there are too few places for me to exercise". In line with our results, Lovell et al. stated that non-exercising female university students in the UK agreed the most with "exercise tires me", "places for me to exercise are too far away", and "exercise is hard work for me" (11). Similarly, Perry et al. found that the most substantial barrier was physical exertion among university students in the UK (14).

The study, which examined university students in Malaysia, showed that lack of time and lack of motivation and physical exertion were among the significant barriers to exercise (12). The previous studies also supported that the lack of time and lack of motivation was the most critical barriers to exercise among university students in Egypt, Saudi Arabia, the UK, and Spain (7,8,10). In Turkey, Daskapan et al. investigated barriers to exercise among inactive university students. They found that the most crucial external barrier was lack of time, while the most critical internal barrier was lack of energy. The authors also emphasized that external barriers, including lack of resources, lack of social support, and lack of time, were higher perceived than the internal barriers, including lack of energy, lack of motivation, and lack of self-efficacy (16). This survey was answered during the university's summer vacation, and the students did not have a course load. Therefore, the participants in this study may have reported that the items related to time expenditure were not barriers to exercise.

In this study and studies above, perceived exercise benefits and barriers were examined using a survey, including an ordinal scale. However, in a small number of studies, researchers examined the students' thoughts on barriers to exercise more comprehensively through open-ended surveys and interviews. The focus group study by Deliens et al. demonstrated that physical activities in Belgian university students were affected by factors within the scope of individual factors, social networks, physical environment, and macro-environment (15). In another study, 67 university students in India were questioned about barriers to exercise through focus group interviews, and the students reported that significant barriers were time constraints, tiredness, stress, family control, safety issues (13). Similarly, the study in Brazil showed that the most referred barriers were uncomfortable climate, family and study obligations, distance to the place of practice, lack of facilities, lack of money to pay professional and safety issues (9).

All these studies with different assessments in different countries have revealed many barriers to exercise in university students. Especially focus group studies also revealed the barriers that could not be reached through questionnaires. There were differences between the importance orders of barriers in these studies. All of these barriers were common to university students.

Furthermore, this study showed that the perceived barriers regarding exercise milieu and physical ex-

ertion played a role in the difference in active and inactive students' physical activity levels. Correlation analyses demonstrated that the total physical activity level was negatively related to exercise milieu and physical exertion, supporting this result. Measures for the removal of these barriers may directly increase the physical activity level in university students.

Increasing physical activity levels and developing physical activity habits for students should be among universities' goals, which is an important place where lifelong habits are shaped. This study showed the possible factors that play a role in differences between active and inactive students. It could be suggested to add lessons related to exercise based on experience rather than theoretical information to university education programs to increase perceived exercise benefits. It is quite worthy of providing suitable places for exercise to remove the barriers to exercise. In addition, the possibilities of individual exercise training should be offered to all students to overcome the negative perception of physical exertion.

This study has some limitations. First, this cross-sectional study was carried out at Gazi University in Turkey. Thus, it may not reflect the overall student profile worldwide. Second, most of the participants were from the faculty of health sciences. They may have more knowledge about exercise benefits. Third, all assessments were made based on participant declaration through questionnaires, and so these assessments were not sufficiently objective. Forth, the data were collected as the COVID-19 pandemic continued. Last, even if exercise benefits/barriers were assessed using a valid and reliable scale, the scale's use limited the assessment. Therefore, future studies addressing this issue with interviews such as focus groups may reveal different related factors.

In conclusion, the present study revealed that active students perceived more exercise benefits than inactive students, whereas they perceived fewer barriers to exercise. The primary factors making a difference between the two groups were life enhancement, physical performance, and psychological outlook in exercise benefits, while these were exercise milieu and physical exertion in barriers to exercise. Furthermore, the total physical activity level was positively related to perceived exercise benefits while negatively related to exercise barriers. Therefore, these results may contribute to effective intervention programs aiming to increase physical activity among university students.

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