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The Relationships among Stages of Exercise Behavior, Body Composition and Perceived Health Levels in University Students

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Abstract

This study aims to investigate the relationship between regular physical activity level, body composition and perceived health levels of university students. Participants of this study were consisted of 331 university students including 158 females and 173 males. The mean ages were 21.85±3,04 years for females and 22.94±5,09 years for males, respectively. Various questions were asked to determine the perceived health levels of university students and body composition was determined by calculating Body Mass Index (BMI). The Stages of Exercise Behavior Change Questionnaire was used to determine the physical activity level. Mann Whitney U test was used to compare two genders while Spearman rank order correlation was performed to test the relationship among variables. Results of our study showed that there are significant differences between males and females in all variables except age and stages of exercise behavior. While the stages of exercise behavior and perceived health level of those who exercise in females are significantly different from those of sedentary, height and exercise behavior level in males are more statistically significant in favor of those who exercise. While the health level in females is positively related to the age variable and negatively related to the BMI, there was no significant difference between the health and exercise level and other variables in males. As a result, it can be concluded that male and female university students do not engage in regular physical activity at a level that will affect their perceived health levels.

Keywords: Physical activity, Transtheoretic Model, Stages of Exercise behavior Change Questionnaire.

Özet

Üniversite Öğrencilerinin Egzersiz Davranışı, Vücut Kompozisyonu ve Algıladıkları Sağlık Düzeyleri Arasındaki İlişki

Bu çalışma, üniversite öğrencilerinin düzenli fiziksel aktivite düzeyi, vücut kompozisyonu ve algılanan sağlık düzeyleri arasındaki ilişkiyi araştırmayı amaçlamaktadır. Çalışmaya 158'i kadın, 173'ü erkek olmak üzere 331 üniversite öğrencisi katılmıştır. Yaş ortalamaları sırasıyla kadınlarda 21,85±3,04, erkeklerde 22,94±5,09 idi. Üniversite öğrencilerinin algıladıkları sağlık düzeylerini belirlemek için çeşitli sorular sorulmuş ayrıca Vücut Kitle İndeksi (VKİ) hesaplanarak vücut kompozisyonu belirlenmiştir. Fiziksel aktivite düzeyini belirlemek için Egzersiz Davranışı Değişim Basamakları Anketi kullanılmıştır. Değişkenler arasındaki ilişkiyi test etmek için Spearman sıralı korelasyonu uygulanırken, iki cinsiyeti karşılaştırmak için Mann Whitney U testi kullanıldı. Çalışmamızın sonuçları, erkek ve kadınların egzersiz davranış aşamaları ile algıladıkları sağlık düzeyleri arasında istatistiksel anlamlı farklılığın olmadığını göstermiştir. Yaş ve egzersiz davranış aşamaları hariç tüm değişkenlerde kadın ve erkekler arasında anlamlı farklılıklar vardır. Kadınlarda egzersiz yapanların egzersiz davranış aşamaları ve algıladıkları sağlık düzeyi sedanterlerden anlamlı düzeyde farklı iken erkeklerde boy uzunluğu ve egzersiz davranış düzeyi egzersiz yapanların lehine daha istatistiksel anlamlı düzeyde farklıdır. Kadınlarda sağlık düzeyi yaş değişkeni ile pozitif ve BKİ ile negatif ilişkili iken erkelerde sağlık ve egzersiz düzeyi ile diğer değişkenler arasında anlamlı farklılık yoktur. Sonuç olarak, erkek ve kadın üniversitelilerin algıladıkları sağlık düzeylerini etkileyecek seviyede düzenli fiziksel aktivite yapmadığı sonucuna varılabilir.

Anahtar Kelimeler: Fiziksel aktivite, Transteoretik Model, Egzersiz Davranışı Değişim Basamakları Anketi.

INTRODUCTION

As globalization has become widespread, individuals have started to develop an increased awareness of their own bodies through activities aimed at enhancing their physical well-being (2). Currently, a weekly regime of 75 to 150 minutes of moderate to high-intensity exercise is deemed essential for maintaining and enhancing overall health, subject to age and individual characteristics (27). By engaging in regular exercise, one can potentially reduce the risks of numerous health problems, including depression and premature death, while maintaining a long, independent, and robust existence (1). Many countries are supporting several projects aimed at making exercise culture a part of life in all sectors of society, as it has positive physiological, sociological, and psychological effects. Several factors hinder one's decision to start exercising and maintaining it (8). As a result, numerous exercise behaviour theories have emerged to make exercising a necessity in living spaces. Among them, the Transtheoretical Model (TTM), originally created by Prochaska and Velicer, is broadly used today (21). This model classifies the stages of change in exercise-oriented behaviour from most negative to highest in the five existing levels of change.

During the first stage, the 'Precontemplation' stage, the individual neither exercises nor intends to start exercising for the next six months. In the second stage, 'Contemplation', the individual still does not exercise, however, intends to start exercising within six months. In the following 'Preparation' stage, the individual does not regularly exercise at the desired level of at least 30 minutes per day and three days per week. In the fourth stage, 'Movement', the individual exercises at the desired level; however, this behaviour has not persisted for more than six months. At the highest level, 'Maintenance', the person has been regularly exercising for more than six months.

The approaches and strategies to be followed for individuals to have positive perspectives on exercise and to maintain continuous exercise behaviors should be planned and implemented by considering these stages. In these stages of change, cognitive (awareness, emotional arousal, re-evaluation of the environment, social liberation-environmental opportunities, self-reevaluation) and behavioral processes (control of stimuli, supportive relationships, counter-conditioning, empowerment, agreement with oneself) play an important role (26).

Delshad et al. obtained the opinions of office workers on exercise using TTM and found that the majority did not intend to exercise or were in the contemplation stage (6). In another study, the exercise behavior stage after open heart surgery was determined using TTM and it was stated that interventions could be made to maintain and improve a healthy lifestyle by increasing the level of physical activity (12). Han et al. reported the lack of relationship between sedentary behaviors of university students and psychological determinants by using newly developed TTM questionnaires (11). In our study, we aimed to establish the basic data necessary to ensure the participation of university students in exercise and the sustainability of this participation and to determine the relationship between exercise behavior level, body composition and health levels.

METHOD

The purpose of this study was to determine the relationship between exercise behaviour, health levels, and body composition of university students.

Our sample of volunteer participants consisted of 331 public, private and foundation university students from Turkey. Demographic information was questioned to determine the age, height, body weight, department of study, chronic disease of the students.

In order to determine the exercise behaviour levels of students, the Exercise Behaviour Change Steps Questionnaire (EBQ) used by Ronda et al. in 2001 will be applied (22). Cengiz et al. (4) evaluated the validity and reliability of the Turkish version of the Exercise Behaviour Change Steps Questionnaire. The EBQ questionnaire consists of 4 questions and is answered as Yes/No. The questions are based on moderate-intensity activities in which a slight increase in breathing and heart rate is observed in physical activities. The questionnaire, administered online using the Google Survey method, aimed to identify exercise intentions and participation habits among university students. The following are the questions: 1. Currently, I engage in moderate physical activity. 2. In the next six months, I plan to increase my engagement in moderate physical activity. 3. Currently, I regularly participate in moderate physical activity. 4. I have been participating in moderate physical activity regularly for the last six months. Body composition was also determined by calculating Body Mass Index (BMI).

The scoring process is as per the following guidelines; Pre-contemplation= 1st question=No; 2nd question=No, Contemplation= 1st question=No; 2nd question=Yes, Preparation= 1st question=No; 2nd question=Yes, Action= 1st question=Yes; 3rd question=Yes; 4th question=No, Maintenance 1st question=Yes; 3rd question=Yes; 4th question=Yes. Moreover, a question was added, with the following wording, 'In the past, I regularly participated in moderate level activities for at least three years' in observance of the Continuation stage. Additionally, to evaluate the health status of the university students, they were instructed to select the most fitting option, from among a) disabled, b) bad, c) moderate, d) good and e) very good alternatives, when answering the question "How would you gauge your prevailing health condition?"

The data were analysed using version SPSS-21. In view of the lack of normal distribution, the Mann-Whitney U test was employed to compare the male and female student groups. Moreover, the Spearman's rank correlation coefficient was calculated to determine the relationship between exercise behaviour, health levels and BMI.

Ethical approval and institutional permission

Our descriptive study was approved by Çukurova University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee (Decision No: 55).

FINDINGS

The results of the analysis of our study conducted to determine the relationship between the level of exercise behaviour, health levels and body composition of university students are given in the tables.

Of the participants whose percentages are given in Table 1, 158 were female and 173 were male students. The distribution between genders is not statistically significant ($p< 0.05$).

Table 1. Distribution of Female and Male Students

Gender	f	%	sd	X^2	Asymp. Sig.
Female	158	47,7			
Male	173	52,3	1	,680	,410
Total	331	100,0			
P<0.05					

The distribution of exercise behaviour levels of female and male students is shown in Table 2. 26 of the females and 33 of the males are in the 'Pre-contemplation' stage. There is a decrease in the number of females and males as they move from the 'Contemlation' stage to other stages. There is no significant difference between the exercise behaviour levels of men and women according to crosstabs analysis.

Table 2. The distributions of the exercise behavior levels of male and female students

Gender	The Level of Exercise Behaviour					Total
	PreContemplation	Contemplation	Preparation	Action	Maintenance	
Female	26 (%14,45)	65 (%41,13)	20 (%12,65)	16 (%10,12)	31 (%19,62)	158 (%100)
Male	33 (%19,07)	61 (%35,26)	16 (%9,24)	18 (%10,40)	45 (%26,01)	173 (%100)
Total	59 (%17,82)	126 (%38,06)	36 (%10,87)	34 (%10,27)	76 (%22,96)	331 (%100)

Crosstabs: X^2=3,426, sd=4, Asymp. Sig.= ,489. * P<0.05 ** P<0.01

There is no significant difference between the distribution of health levels of male and female students. 181 students stated their health level as 'Good and Very Good', while 150 students stated their health level as 'Disabled, Poor and Moderate' (Table 3). When the health levels of male and female students were analyzed, it was seen that there was no significant difference.

Table 3. Distribution of health levels of female and male students

Gender	Health Level					Total
	Disabled	Poor	Fair	Good	Very Good	
Female	1 (%0,63)	6 (%3,79)	74 (%46,83)	61 (%38,60)	16 (%10,12)	158 (%100)
Male	3 (%1,73)	4 (%2,31)	62 (%35,83)	78 (%45,08)	26 (%15,02)	173 (%100)
Total	4 (%1,20)	10 (%3,02)	136 (%41,08)	139 (%41,99)	42 (%12,68)	331 (%100)

Crosstabs: X^2=6,252, sd=4, Asymp. Sig.= ,1181 * P<0.05 ** P<0.01

The study analysed the connection between body composition (age, height, body weight, BMI, exercise behaviour) with the health levels of male and female students using the Mann-Whitney U test. Table 4 shows significant differences in the height, body weight, BMI, and health levels of the students.

Table 4. Comparison of body composition, exercise behaviour and health levels of female and male students

	Group	N	X	S.S.	MWU	Z	Asymp. Sig.
Age (years)	**Female**	158	21,85	3,04	12519,5	-1,336	,181
	Male	173	22,94	5,09			
	Total	331	22,42	4,26			
Body Height (cm)	**Female**	158	163,86	6,49	3348,5	-11,881	**,000****
	Male	173	175,38	7,49			
	Total	331	169,88	9,08			
Body Weight (kg)	**Female**	158	58,99	9,94	6300,5	-8,475	**,000****
	Male	173	71,76	14,43			
	Total	331	65,66	14,01			
BMI	**Female**	158	21,97	3,56	10474,0	-3,672	**,000****
	Male	173	23,19	3,57			
	Total	331	22,61	3,61			
Stages of Exercise Behaviour (1-5 points)	**Female**	158	2,75	1,38	13166,0	-,599	,549
	Male	173	2,89	1,50			
	Total	331	2,82	1,45			
Health Level (1-5 points)	**Female**	158	21,85	3,04	11991,5	-2,084	**,037***
	Male	173	22,94	5,09			
	Total	331	22,42	4,26			

*** P<0.05 ** P <0.01**

Table 5 and Table 6 respectively show a comparison of the body composition, exercise behaviour and health levels of sedentary and exercising female and male students.

Table 5. Comparison of body composition, exercise behaviour and health levels of sedentary and exercisers in female university students

	Group	N	X	S.S.	MWU	Z	Asymp. Sig.
Age (years)	**Sedentary**	111	21,77	2,88	2541,5	-,259	,796
	Exercised	47	22,06	3,42			
	Total	158	21,85	3,04			
Body Height (cm)	**Sedentary**	111	163,68	6,09	2397,5	-,805	,421
	Exercised	47	164,28	7,41			
	Total	158	163,86	6,49			
Body Weight (kg)	**Sedentary**	111	58,45	9,02	2409,0	-,760	,447
	Exercised	47	60,26	11,84			
	Total	158	58,99	9,94			
BMI	**Sedentary**	111	21,83	3,32	2490,5	-,449	,654
	Exercised	47	22,30	4,09			
	Total	158	21,97	3,56			
Stages of Exercise Behaviour l (1-5 points)	**Sedentary**	111	1,95	0,64	,000	-10,370	**,000****
	Exercised	47	4,66	0,48			
	Total	158	2,75	1,38			
Health Level (1-5 points)	**Sedentary**	111	21,77	2,88	2082,5	-2,185	**,029***
	Exercised	47	22,06	3,42			
	Total	158	21,85	3,04			

*** P<0.05 ** P<0.01**

Significant differences were obtained in Stages of Exercise Behaviour Change (p<0.01) and Health Level (P<0.05) of female students.

Table 6. Comparison of body composition, exercise behaviour and health levels of sedentary and exercising male students

	Group	N	X	S.S.	MWU	Z	Asymp. Sig.
Age (years)	**Sedentary**	110	22,71	5,00	3242,0	-,711	,477
	Exercised	63	23,33	5,25			
	Total	173	22,94	5,09			
Body Height (cm)	**Sedentary**	110	174,50	7,17	2793,5	-2,122	**,034***
	Exercised	63	176,92	7,85			
	Total	173	175,38	7,49			
Body Weight (kg)	**Sedentary**	110	71,11	13,93	3229,0	-,745	,456
	Exercised	63	72,89	15,31			
	Total	173	71,76	14,43			
BMI	**Sedentary**	110	23,22	3,56	3449,5	-,049	,961
	Exercised	63	23,14	3,62			
	Total	173	23,19	3,57			
Stages of Exercise Behaviour (1-5 points)	**Sedentary**	110	1,85	0,65	,000	-11,336	**,000****
	Exercised	63	4,71	0,46			
	Total	173	2,89	1,50			
Health Level (1-5 points)	**Sedentary**	110	22,71	5,00	3239,0	-,769	,442
	Exercised	63	23,33	5,25			
	Total	173	22,94	5,09			

*** P<0.05 ** P<0.01**

Significant differences were obtained in exercise behaviour level (P<0.01) and height (P<0.05) of male students.

The relationship between body composition and exercise behaviour and health levels of female students is shown in Table 7.

Table 7. The relationship between Spearman correlation coefficients of body composition and exercise behaviour and health level variables in female students

Variables	1.Health Level	2.Exercise Behaviour Level	3.Age	4. Height	5.Weight
1.Health Level	1				
2. Stages of Exercise Behaviour	,146	1			
3.Age	,092	-,011	1		
4. Height	**,162***	,021	,086	1	
5.Weight	-,123	,036	,156	**,409****	1
6.BMI	**-,216****	,017	,112	-,024	**,872****

* There is a significant difference between the two groups at 0.05 level.

** There is a significant difference between the two groups at 0.01 level.

Significant relationships were found between height and BMI with health level and body weight with height and BMI in female students.

Table 8. The relationship between Spearman correlation coefficients of body composition and exercise behaviour and health level variables in male students

Variables	1.Health Level	2.Stages of Exercise Behaviour	3.Age	4. Body Height	5.Body Weight
1.Health Level	1				
2. Stages of Exercise Behaviour	,078	1			
3.Age	,027	,028	1		
4. Body Height	,105	,128	,114	1	
5.Body Weight	,022	,066	**,211****	**,673****	1
6.BMI	-,059	,022	**,181***	**,311****	**,902****

* There is a significant difference between the two groups at 0.05 level.
** There is a significant difference between the two groups at 0.01 level.

In male students, significant relationships were obtained between age and body weight and BMI, height and body weight and BMI, and body weight and BMI.

DISCUSSION AND CONCLUSION

Exercise has an important place among the strategies to be implemented to protect and improve health in all ages and genders. Lifelong sustainability as well as the age of starting exercise is important in improving health. Consequently, the purpose of our study was to assess the exercise-related behaviour levels of university students and explore the correlation between their health status and body composition. In simpler terms, the study aimed to investigate the attitudes of university students towards physical exercise, and identify the approaches that can be implemented to encourage regular exercise.

According to the results of this study, it was determined that most of the university students constituting our population were not even at the stage of starting exercise. The reasons why university students do not start exercising include academic pressure, time limitation, lack of facilities and exercise guides (20). The decrease in the level of physical activity observed in these age groups is likely to affect health negatively in the future. Çeker et al. (5) found similar results in their study on different age groups and found a decrease in the rate of participation in physical activity with increasing age. Therefore, considering exercise as a lifestyle and doing it for a lifetime should be one of the main goals. It is thought that exercise habits gained during the university period will be a pioneer in continuing exercise in the future. In this context, Ziyagil et al. (28) emphasised that the reasons for university students' participation in exercise and why they quit exercise should be well known and strategies should be developed for this situation.

According to Delshad et al.'s study that used the TTM model, 32.9% of office workers showed 'Contemplation' stage in their exercise behaviour attitude. Likewise, Emdadi (10) and Delshad (6) reported that 30.5% of female college students' exercise behaviour levels were in the 'Contemplation' stage in their respective studies. In our study, the 'Contemplation' stage of exercise behaviour was observed in 41.13% (65 persons) of female students and in 35.26% (61 persons) of male students, with similar results. Students may not initiate exercise due to lack of information regarding effective exercise management (20). Therefore, the provision of professional exercise guidance at universities is believed to alter the students' view towards exercise and kindle their interest. Effective use of social media to highlight the benefits of exercise through remarkable advertising can specifically reduce the count of sedentary students.

Our study questioned the health levels of male and female students and found no significant differences between the two genders. However, nearly half of the 331 students reported their health as 'Disabled, Poor, and Moderate'. According to Ebem (9), the reasons for health problems include poor exercise behaviour and poor education of the family and school on this subject. In this case, education on this subject should be emphasised by prioritising 'health protection and improvement' in the strategies for participation in exercise activities. Male students had an average BMI of 23.19, whereas female students had an average BMI of 21.97.

These differences between the two genders are due to sexual dimorphism, which explains that the body structure between men and women is not the same (15). In addition, the fact that the population consisted of university students suggests that the rate of chronic diseases is relatively lower in higher age groups (16). Physical activity level in these age groups constitutes the basis of adult health. According to a study, it has been reported that the level of physical activity decreases when passing from high school to university (3). With aging, there is an increase in weight gain with a decrease in physical activity due to physiological, psychological and sociological reasons (25). Laredo-Aguilera et al. (17) reported that the rate of obesity increased with increasing age and that men between the ages of 18-30 years participated in physical activity more than women. In our study, it was observed that the exercise behaviour level of men was 6.39% higher than that of women at the 'Continuation' stage. Research has shown that women tend to participate in exercise less than men, primarily due to their responsibilities towards family care, sociocultural differences, and household chores (19). Among the reasons why university students do not start and maintain regular exercise; inability to allocate time for exercise due to academic performance anxiety, lack of security, lack of suitable places for exercise, lack of social support, overload of study programmes and subsequent lack of sleep, insufficient scientific information about the importance of exercise and socio-cultural differences can be counted (14, 19). According to Sirard et al. (23), men's competitive nature increased their motivation to participate in physical activity compared to women. Furthermore, Mori et al. (18) reported that women's participation in physical activity declines as they age. Therefore, exercise programmes should emphasise various motivational projects for university students, especially women. Moreover, Ignatjeva et al. (13) reported that women are more health-conscious than men. To promote the participation of university students in physical activity and ensure its sustainability, various parameters such as health, social group membership, competition, entertainment, body image, and success can be used to increase motivation and interest as part of our strategy (7, 24).

As a result, the findings of this study show that there are significant differences in all variables except age and exercise behaviour level due to gender factor. In females, exercise level and perceived health level of exercisers were significantly different from those who were physically inactive, while in males, height and exercise behaviour level were significantly different in favour of exercisers. While the health level in females was positively correlated with age and negatively correlated with BMI, there was no significant difference between health and exercise levels and other variables in males. As a result, it can be concluded that male and female university students do not perform regular physical activity at a level that will affect their perceived health levels and do not have obesity problems and 4% of both genders report health problems.

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