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An Investigation of University Students' Changes Occurred in Some Body Composition Measurements in Two Years

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Abstract

The aim of this study is to examine the changes in the body composition and the obestity status of university students at the beginning and the end of the two-year period. Body weight, waist circumference, hip circumference, fat ratio, muscle ratio, waist-hip ratio and body mass index parameters of university students were measured at the beginning of the first year and at the end of the second year. The homogeneity of the variance of the data was tested using the Levene's Test and the normality of the distribution was tested with the Shapiro-Wilk Test. In the analysis of all the parameters Willcoxon Test was used. Significance was determined at $p>0.05$ level. In the body weight, waist circumference and fat ratio parameters of the volunteers there was a statistically significant difference between the pretest-posttest values of female students ($p<0.05$); however, there was no difference in male students ($p>0.05$). On the other hand, there was a statistically significant difference in the pretest-posttest values of both sexes in muscle ratio, waist-hip ratio and BMI parameters ($p<0.05$). Both increases and decreases were observed between the parameters of the volunteers measured at the beginning and the end of the two-year period. It was determined that the body mass index values decreased and normalized in girls and boys who continued their routine lives, waist-hip ratio was in the risk group in both girls and boys similarly, and the girls were in the risky group regarding the waist circumference values. The findings revealed that following these parameters, which are the significant indicators of well-being, and taking necessary precautions play a critical role in the case of a health problem which may emerge in the future. Nursing students who are at risk while continuing their routine lives should lead a healthy lifestyle. We are convinced that nursing students who will serve the society to protect and improve health should be more careful about their body compositions in terms of both their health and social roles.

Key Words: Waist circumference, Hip circumference, Waist-hip raito, Body mass index, Fat ratio

Üniversite Öğrencilerinin Bazı Vücut Kompozisyonu Ölçümlerinde İki Yılda Meydana Gelen Değişimlerin İncelenmesi

Öz

Bu çalışmanın amacı, üniversite öğrencilerinin iki yıllık sürenin başlangıcında ve sonunda vücut kompozisyonlarında meydana gelen değişikliklerin ve obezite durumlarının incelenmesidir. Üniversite öğrencilerinin vücut ağırlığı, bel çevresi, kalça çevresi, yağ oranı, kas oranı, bel-kalça oranı ve vücut kitle indeksi parametreleri birinci yılın başında ve ikinci yılın sonunda ölçülmüştür. Verilerin varyans homojenitesi Levene Testi ile normal dağılım analizleri ise Shapiro-Wilk Testi ile yapılmıştır. Tüm parametrelerin analizinde Willcoxon Testi kullanılmıştır. Anlamlılık $p>0.05$ düzeyinde belirlenmiştir. Gönüllülerin vücut ağırlığı, bel çevresi ve yağ oranı parametrelerinde kız öğrencilerin ön test-son test değerleri arasında istatistiksel olarak anlamlı fark tespit edilirken ($p<0.05$), erkek öğrencilerde fark yoktur ($p>0.05$). Kas oranı, bel-kalça oranı ve VKİ parametrelerinde ise her iki cinsiyetin ön test-son test değerlerinde istatistiksel olarak anlamlı farklılık tespit edilmiştir ($p<0.05$). Gönüllülerin iki yıllık sürenin başında ve sonunda ölçülen parametreleri arasında artmalar ya da azalmalar görülmüştür. Rutin yaşamlarına devam eden kızlarda ve erkeklerde vücut kitle indeksi değerlerinin azalarak normalleştiği, hem kızlarda hem de erkeklerde bel-kalça oranının risk grubunda olduğu ve kızların bel çevresi değerlerine göre riskli grupta oldukları saptanmıştır. Sağlık açısından önemli belirteçler olan bu parametrelerin ileriki yıllarda yaşanabilecek sağlık sorunları açısından takibinin ve gerekli tedbirlerin alınmasının önemi ortaya çıkmıştır. Henüz rutin yaşamlarını devam ettirirken risk altında kalan hemşirelik bölümü öğrencilerinin sağlıklı yaşam biçimi davranışları sergilemeleri gerekmektedir. Sağlığı korumaya ve geliştirmeye yönelik topluma hizmet verecek olan hemşirelik bölümü öğrencilerinin hem sağlıkları hem de toplumsal rolleri açısından vücut kompozisyonları konusunda daha dikkatli olmaları gerektiği kaanatindeyiz.

Anahtar Kelimeler: Bel çevresi, Kalça çevresi, Bel-kalça oranı, Vücut kitle indeksi, Yağ oranı

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Introduction

Obesity is characterized by the fact that the energy taken with the nutrients to the body is more than the energy spent and the body fat mass increases compared to the lean body mass (WHO, 2000, p. 1-252; Donohoue, 2004, p. 173-177; Kokino et al., 2006, p. 47-54). The incidence of obesity is increasing in alarming levels in both developed and developing countries in the world. Because the prevalence of overweightness and obesity increases day by day in our country as in the other countries of the world, it is emphasized as the most important health problem for both media and doctors (Kaya, & Özçelik, 2005, p. 164-168; Çayır et al., 2011, p. 13-19; Satman, 2011, p. 1-36). Obesity is also associated with chronic diseases such as cardiovascular diseases, some types of cancer and type 2 diabetes (Flegal et al., 2005, p. 1861-1867), and becomes a huge burden on health systems (Wolf, & Colditz, 1996, p. 466-469).

The poor level of health that occurs due to obesity usually occurs in the older ages. However, the causes of poor health level can develop in childhood, youth or adulthood. The transition period from adolescence to adulthood is a critical period in weight gain (Gordon-Larsen et al., 2004, p. 569-575). The youth period is known as the most dynamic period for the individual and society. For the individual, the youth period is the process of transition from childhood to adulthood and the character formation through socialization. This process involves the biological, psychological and social development of the teenager, which will shape his entire life. Thus, the young affects the society they live in and is affected by the problems of that society, and actively participates in social development and events. This situation becomes more important during the age of 17 and after, which coincides with the university years. University life is the years when there are important changes in the lives of young people (Tuğut, & Bekar, 2007, p. 17-26).

Problems such as fatness or obesity are experienced due to nutritional disorders caused by collective eating, economic difficulties, irregular eating habits, constant meal skipping, unhealthy food preferences encountered during university education (Özütürker, &Özer, 2016, p. 63-73). The weight gained at an early age increases in the following years and causes the obesity development and accordingly the increase of risk factors. Therefore, body composition analysis in children and adolescents has an important role in obesity development and treatment (Kaya, & Özçelik, 2005, p. 164-168).

When nursing students defined as young population are taken into consideration, the applications to be planned specifically for this age group are essential for the future society to be healthy. During their university years, individuals leave their families, become open to environmental factors and can make their choices freely. This situation causes students to develop a lifestyle that will negatively affect their health. It is observed that young people often carry this lifestyle they have acquired after the education. Excess weight and obesity caused by an unhealthy lifestyle can only be prevented by individuals changing their habits positively (Tedik, & Hacıalioğlu, 2017).

One of the most important issues on obesity is to determine and keep track of the body composition of the people and to take necessary interventions before obesity develops. Therefore, the aim of this study is to examine the changes in the body composition of university students at the beginning and the end of the two-year period.

Method

Participants

20 male students (mean height = 179.20±10.39 cm, mean body weight = 76.07±21.69 kg, mean BMI = 23.43±4.25 kg/m^2, mean age = 23.00±1.49 years), and 20 female students who study at the nursing department (mean height = 166.80±4.89 cm, mean body weight = 74.10±9.28 kg, mean BMI = 24.90±3.02 kg/m^2, mean age of 22.20±1.44 years) were randomly selected and voluntarily participated in the present study. All parameters were measured at the beginning of the first year and at the end of the second year by the same researcher. The study was approved by the Ethical Committee of Bilecik Şeyh Edebali University (2020-6/9) and conducted in accordance with the World Medical Association Helsinki Declaration.

Anthropometric Measurements

Body Height Measurement; Body height of the players was measured using a stadiometer (Holtain, UK). The measurements were taken while the person's body weight was evenly distributed on both legs, with

the head in the "Frankfort Horizontal Plan" position, with the arms on the side of the body, with the palms facing the legs and in bare feet (Akın et al., 2004, p. 161-167).

Body Weight Parameters Measurement; Body weight parameters (body weight, body fat percentage, muscle ratio) was measured by Tanita MC780 (Japan) brand body fat analyzer. Measurements were taken before breakfast, without any nutrients. Measurements were made while participants were wearing shorts and T-shirts. The metal parts of the platform that touch the hands and feet are wiped with a damp cloth after each player leaves the platform (Işın, & Melekoğlu, 2019, p. 80-86).

Body fat percentages were evaluated according to the following reference intervals: in men; 5-10 Athletic, 11-14 Good, 15-20 Acceptable (Normal), 21-24 Overweight, 24> Fat (Obese or Overweight), and in women; 8-15 Athletic, 16-23 Good, 24-30 Acceptable (Normal), 31-36 Overweight, 37> Fat (Obese or Overweight) (Jeukendrup, & Gleeson, 2010, p. 316).

Waist and Hip Circumference Measurement; Hip circumference of the volunteers was measured after they are requested to breath normally in standing upright position, with feet 12-15 cm apart and weight evenly distributed. Hip circumference was measured as the maximum distance around the posterior and anterior gluteal region by the symphysis pubis, with a tape. Measurements were recorded to the nearest 0.1 cm (Akpınar et al., 2007).

Classification according to waist circumference was carried out on the following criteria: in women; less than 80 cm were considered normal, between 80-88 cm constituted the risky group who are prone to obesity, and the those over 88 cm were considered obese, and in men; less than 94 cm were considered normal, 94-102 cm constituted obesity prone risk group and those over 102 cm were considered obese (WHO, 2008, p. 20-27).

Waist - Hip Ratio (WHR); After taking the waist and hip circumference measurements of the volunteer (WHO, 2008, p. 20-27), WHR was formulated as follows:

WHR = (Waist circumference [cm]/Hip circumference [cm]).

While the waist hip ratio that is lower than 0.90 is normal in men, it is the risky if it is above 0.90; in women on the other hand, below 0.85 is considered normal, while 0.85 and above are considered as risky waist hip ratio (WHO, 2008, p. 20-27).

Body Mass Index; After taking body weight and height measurements (WHO, 2008), Body Mass Index was formulated as follows: BMI = (Weight [kg]/Height^2 [m])

In the international obesity classification of the World Health Organization, those whose Body Mass Index categories are below 18.5 are "underweight", those between 18.5 and 24.9 are "normal", those between 25.0 and 29.9 are "overweight", those above 30.0 are "obese" (WHO, 2008, p. 20-27).

Statistical Analysis

SPSS 23 (SPSS Inc., Chicago, IL, USA) package program was used for statistical analysis of the data obtained from the current study. The homogeneity of the variance of the data was tested using the Levene's Test and the normality of the distribution was tested with the Shapiro-Wilk Test. Willcoxon Test was used in the analyses of all parameters. Significance was determined at $p > 0.05$ level. Arithmetic mean, standard deviation and percentage values of the obtained data in the study are also presented.

Results

Age, height, body weight, waist circumference, hip circumference, body fat ratio, body muscle ratio, waist-hip ratio and body mass index values of the volunteers participating in the study are presented in the table below.

Table 1. *Physical Properties of Students*

Variables	***Gender***	***n***	***$\bar{x} \pm sd$***
Age (year)	Male	20	23.00±1.49
	Female	20	22.20±1.44
Height (cm)	Male	20	179.20±10.39
	Female	20	166.80±4.89
Body Weight (kg)	Male	20	76.07±21.69
	Female	20	74.10±9.28
Waist Circumference (cm)	Male	20	87.10±12.46
	Female	20	88.70±8.64
Hip Circumference (cm)	Male	20	101.35±8.75
	Female	20	95.20±7.69
Body Fat Ratio (%)	Male	20	17.84±7.12
	Female	20	30.30±8.33
Muscle Ratio (%)	Male	20	41.20±4.36
	Female	20	30.34±5.04
Waist-Hip Raito (cm)	Male	20	0.86±0.06
	Female	20	1.03±0.07
Body Mass Index (kg/m2)	Male	20	23.43±4.25
	Female	20	24.90±3.02

$\bar{x}$: mean value, sd: standard deviation

When Table 1 is examined, the mean age, height, body weight, waist circumference, hip circumference, fat ratio, muscle ratio, waist-to-run ratio and body mass index of male volunteers (n:20) are 23.00±1.49 years, 179.20±10.39 cm, 76.07±21.69 kg, 87.10±12.46 cm, 101.35±8.75 cm, 17.84±7.12%, 41.20±4.36, 0.86±0.06 cm, 23.43±4.25 kg/m² respectively. On the other hand, mean age, height, body weight, waist circumference, hip circumference, fat ratio, muscle ratio, waist-to-waist ratio and body mass index of the female volunteers (n: 20) are 22.20±1.44 years, 166.80±4.89 cm, 74.10±9.28 kg, 88.70±8.64 cm, 95.20±7.69 cm, 30.30±8.33%, 30.34±5.04%, 1.03±0.07 cm, 24.90±3.02 kg/m² respectively.

Table 2. *Students' Body Mass Index-Gender Distribution*

BMI (kg/m ²)	***Gender***	***n***	***Pretest***	***%***	***Post test***	***%***
Underweight <18.5	Male	20	1	5	3	15
	Female	20	1	5	1	5
Normal 18.5-24.9	Male	20	13	65	14	70
	Female	20	6	30	13	65
Overweight 25.0-29.9	Male	20	5	25	3	15
	Female	20	13	65	6	30
Obese >30.0	Male	20	1	5	0	0
	Female	20	0	0	0	0

While 65% of male students were found to be "normal", 25% were overweight and 5% were obese in the preliminary measurements, 70% of them were "normal" and 15% were overweight in the last measurements. In the preliminary measurements, 30% of female students were found to be "normal", 65% of them were "overweight", and in the final measurements 65% of them were "normal" and 30% of them were "overweight".

Table 3. *Students' Waist Hip Ratio-Gender Distribution*

Waist Hip Ratio Risk Limit	***Gender***	***n***	***Pretest***	***%***	***Post test***	***%***
<0.90 cm	Male	20	14	70	9	45
≥0.90 cm			6	30	11	55
<0.85 cm	Female	20	1	5	3	15
≥0.85 cm			19	95	17	85

While the waist hip ratio of 6% of male students was over ≥0.90 in the preliminary measurements, the waist hip ratio of 11% of them in the last measurements was above ≥0.90. On the other hand, 19% of female students had a waist-hip ratio above ≥0.85, while 17% of them had a ratio above ≥0.85 during the last measurements.

Table 4. *Students' Waist Circumference-Gender Distribution*

Waist Circumference Risk Limit	*Gender*	*n*	*Pretest*	*%*	*Posttest*	*%*
Normal						
<94 cm	Male	20	16	80	17	85
<80 cm	Female	20	3	15	2	10
Risk						
94-101.9 cm	Male	20	1	5	2	10
80-87.9 cm	Female	20	3	15	8	40
High Risk						
≥102 cm	Male	20	3	15	1	5
≥88 cm	Female	20	14	70	10	50

While 5% of male students were at risk group in preliminary measurements, this rate increased to 10% in the final measurements. Again, while 15% of male students were in high risk group, this rate decreased to 5% in the last measurements. On the other hand, while 15% of female students were in the risky group in preliminary measurements, this rate rises to 40% in the final measurements. Again, while 70% of the female students were in the high risk group in the preliminary measurements, 50% of them were in the same group in the final measurements.

Table 5. *Pretest-Posttest Distribution of the Students According to Variables*

Variables	*Gender*	*n*	*Pretest* $\bar{x} \pm sd$	*Post test* $\bar{x} \pm sd$	*z*	*p*
Body Weight (kg)	Male	20	76.07±21.69	76.80±16.03	-.87	0.38
	Female	20	74.10±9.28	70.77±9.74	-3.06	0.00*
Waist Circumference (cm)	Male	20	87.10±12.46	86.15±7.94	-.54	0.59
	Female	20	88.70±8.64	85.21±9.86	-2.92	0.00*
Hip Circumference (cm)	Male	20	101.35±8.75	97.25±8.57	-1.61	0.11
	Female	20	95.20±7.69	92.70±10.02	-1.87	0.06
Body Fat Ratio (%)	Male	20	17.84±7.12	17.08±5.80	-.86	0.39
	Female	20	30.30±26.86	26.86±8.29	-2.48	0.01*
Muscle Ratio (%)	Male	20	41.20±4.36	43.57±4.01	-1.94	0.05*
	Female	20	30.34±5.04	31.99±5.61	-3.66	0.00*
Waist-Hip Ratio (cm)	Male	20	0.86±0.06	0.89±0.07	-2.78	0.00*
	Female	20	1.03±0.07	0.92±0.08	-3.66	0.00*
Body Mass Index (kg/m²)	Male	20	23.43±4.25	20.38±2.92	-2.52	0.01*
	Female	20	24.90±3.03	22.61±3.15	-2.99	0.00*

*p<0.05

While a statistically significant difference was found between the pre-test and post-test results of female students in body weight, waist circumference and fat ratio parameters (p <0.05), there was no difference in male students (p> 0.05). There was a statistically significant difference in the pretest-posttest values of both sexes in muscle ratio, waist-hip ratio and BMI parameters (p <0.05).

Discussion

With developing methods, studies on obesity and body compositions show a significant increase. Studies conducted in different parts of the world have revealed that the ratio of fat in body composition has been increasing, and as a result, there are significant growth in various health problems (Kaya, & Özçelik, 2005, p. 164-168; Evans et al., 2012, p. 1-7; Mushonga et al., 2014, p. 30-33; Zileli et al., 2016, p. 549-562).

In the diagnosis and evaluation of obesity, there are various methods used to evaluate the amount and distribution of body fat. Among these, anthropometric measurements (Bioelectrical Impedance Analysis (BIA), body mass index, waist and hip circumference measurement) are the most commonly used for their low cost and easy applicability. These methods differ from each other in terms of their applicability, costs and accuracy. Therefore, these methods can be used together for more objective results in obesity risk assessment (Yıldırım et al., 2017, p. 20-33). BMI is a simple measure of determining obesity,

but it is not the only measure. Waist circumference is another parameter that needs to be checked for health. Handling the BMI together with the waist-hip ratio may yield more valuable results in terms of diseases (Ergün, & Erten, 2004, p. 57-61; Akpınar et al., 2007, p. 387-393; Booth et al., 2000, p. 1058-1061). The World Health Organization also states that assessing BMI, waist circumference and waist hip ratio together can offer advantages. (WHO, 2008, p. 20-27). In a study conducted on young adults, it was emphasized that the BMI, waist circumference and waist-hip ratio, which were found to be high, may lead to cardiovascular diseases in the following years (Azizi et al., 2004, p. 887-897). Therefore, in our study, a general evaluation was made according to the data obtained from different methods.

When the data published by TÜİK in 2015 is analysed, the changes observed in the rates of obese individuals over the age of 15 are as follows; The obesity rate in males, which was 12.3% in 2008, increased to 13.2% in 2010, to 13.7% in 2012 and to 15.3% in 2014. Obesity rates in women increased from 18.5% in 2008 to 21% in 2010 and decreased to 20.9% in 2012. In 2014, it was determined as 24.5% with a very high increase. Considering these two tables, the proportion of overweight men in Turkey is higher than women each year, but in obesity classification women have higher proportions than men (TUİK, 2015, p. 1-2.). These data are in line with our findings.

Regarding the health problems and economic burden caused by obesity, the importance of early diagnosis is quite obvious. In terms of the problems which may arise in the future, the determination and follow-up of students' obesity related parameters are very important. In order to prevent undesirable future problems with respect to public health, the current state of the students' body compositions should be revealed and followed periodically.

Obesity, which can be seen at any age and increases with age (Yıldırım et al., 2017), is rapidly growing among university students. As a result of this increase and the health problems it caused, the importance of the subject has been emphasized in every environment. However, these problems do not attract the attention of the society sufficiently owing to the lifestyle changes brought about by modern life and the lack of studies on obesity among university students (Tedik, & Hacıalioğlu, 2017).

In the present study it was found out that the body weight of boys remained the same, the values of waist circumference decreased, hip circumference values decreased, fat ratio decreased, muscle ratio values increased, waist-hip ratio values increased, body mass index values decreased. On the other hand, it was determined that girls' body weight decreased, waist circumference values decreased, hip circumference values decreased, fat ratio values decreased, muscle ratio values increased, waist-hip ratio values decreased, body mass index values decreased (Table 5). The findings of our study are similar to the literature.

Ergün and Erten (2004), in their study which was conducted on Ankara Medical Faculty 2nd year students and investigated the weight, height, and BMI values and waist circumference among male and female students, found that more than 10.5% of them were overweight and 1.5% were obese. According to waist circumference, obesity was found to be 3.1% in women and 1.4% in men. Kuyumcu (2007) in his study examining the changes in body mass index in the 1st and 6th grade students of Ankara University Faculty of Medicine discovered that preobesity which was 12.2% in the 1st grade increased to 18.4% in the 6th grade, and while obesity in the 1st grade was 3.1% and it icreased to 3.8% in the 6th grade.

When Tedik and Hacıalioğlu (2017) examined their nursing students according to their BMI; they found that 65% of the students were normal weight, about 19% were overweight and 16.2% were obese. Accordingly, he recommended that overweight students who are at risk should be identified with early diagnosis and that healthy lifestyle behaviors should be improved in these students and thus obesity should be prevented. Yıldırım et al. (2017) in their study conducted on university students found that according to their BMI values, 24.87% of women and 33.53% of men had body weight above normal, according to waist circumference values, 40.67% of women and 20.81% of men were at risk group, and according to their body fat percentage values 30.62% of women and 20.23% of men were in the risky group. In their study, Yılmaz and Aksoy (2018) determined that 23.2% of the nursing students had BMI values between 25.0-40.0 and stigmatized themselves because of their weight. Korkmaz et al. (2019) emphasized that 19.1% of nursing students were overweight and 9% were obese, and in order to protect and improve their health, education programs should be created.

As a result, some increases and decreases were observed in the parameters of the volunteers measured at the beginning and end of the two-year period. It was found that the body mass index values decreased and normalized in both girls and boys, the ratio of waist-hip in the girls and boys put them in

the risky group, and also according to the waist circumference values, the girls were in the risky group (Table 2, 3, 4). The findings revealed that following these parameters, which are the significant indicators of well-being, and taking necessary precautions play a critical role in the case of a health problem which may emerge in the future. Nursing students who are at risk while continuing their routine lives should exhibit healthy lifestyle behaviors. We are in the opinion that nursing students who will serve the society to protect and improve health should be more careful about their body compositions in terms of both their health and social roles.

Ethical Declaration

In the writing process of the study titled *"An Investigation of University Students' Changes Occurred in Some Body Composition Measurements in Two Years",* there were followed the scientific, ethical and the citation rules; was not made any falsification on the collected data and this study was not sent to any other academic media for evaluation.

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Obezite; vücuda besinler ile alınan enerjinin, harcanan enerjiden fazla olmasından kaynaklanan ve vücut yağ kitlesinin, yağsız vücut kitlesine oranla artması ile karakterizedir (WHO, 2000, s. 1-252; Donohoue, 2004, s. 173-177; Kokino vd., 2006, s. 47-54). Obezite görülme sıklığı dünyada gelişmiş ve gelişmekte olan ülkelerde alarm verici boyutlarda artmaktadır. Ülkemizde de diğer dünya ülkelerinde olduğu gibi fazla kilololuğun ve obezitenin prevelansı gün geçtikçe artmasından dolayı gerek medya gerek doktorlar açısından en önemli sağlık problemi olarak vurgulanmaktadır (Kaya ve Özçelik, 2005, s. 164-168; Çayır vd., 2011, s. 13-19; Satman, 2011, s. 1-36). Obezite aynı zamanda kardiyovasküler hastalıklar, bazı kanser tipleri, tip 2 diyabet (Flegal vd. , 2005, s. 1861-1867) gibi kronik hastalıklarla ilişkilidir ve sağlık sistemlerine çok büyük bir yük getirmektedir (Wolf ve Colditz, 1996, s. 466-469).

Üniversite eğitimi sürecinde karşılaşılan; toplu halde beslenmenin yol açtığı beslenme bozuklukları, ekonomik sıkıntılar, düzensiz beslenme alışkanlığı, sürekli öğün atlanması, sağlıksız besin tercihleri gibi durumlar sebebiyle şişmanlık veya obezite gibi sorunlarla karşılaşılmaktadır (Özütürker ve Özer, 2016, s. 63-73). Erken yaşlarda alınan kiloların ilerleyen yıllarda artarak obezite gelişme oranını ve buna bağlı olarak risk faktörlerinin artmasına yol açmaktadır. Bu nedenle çocuk ve gençlerde vücut kompozisyon analizi obezite gelişimi ve tedavisinde önemli bir yer tutmaktadır (Kaya ve Özçelik, 2005, 164-168).

Obezite ile ilgili çalışmaların en önemlilerinden biri, obezite gelişmeden kişilerin vücut kompozisyonlarının belirlenip takip altında tutulması ve gerekli müdahalelerin yapılmasıdır. Bu yüzden bu çalışmanın amacı; Üniversite öğrencilerinin iki yıllık sürenin başlangıcında ve sonunda vücut kompozisyonlarında meydana gelen değişikliklerin incelenmesidir.

Hemşirlik bölümü öğrencilerinin vücut ağırlığı, bel çevresi, kalça çevresi, yağ oranı, kas oranı, bel-kalça oranı ve vücut kitle indeksi parametreleri birinci yılın başında ve ikinci yılın sonunda ölçülmüştür. Verilerin varyans homojenitesi Levene Testi ile normal dağılım analizleri ise Shapiro-Wilk Testi ile yapılmıştır. Tüm parametrelerin analizinde Will Coxon Testi kullanılmıştır. Anlamlılık $p>0.05$ düzeyinde belirlenmiştir. Gönüllülerin vücut ağırlığı, bel çevresi ve yağ oranı parametrelerinde kız öğrencilerin ön test-son test değerleri arasında istatistiksel olarak anlamlı fark tespit edilirken ($p<0.05$), erkek öğrencilerde fark yoktur ($p>0.05$). Kas oranı, bel-kalça oranı ve VKİ parametrelerinde ise her iki cinsiyetin ön test-son test değerlerinde istatistiksel olarak anlamlı farklılık tespit edilmiştir ($p<0.05$).

Obezitenin neden olduğu sağlık problemleri ve ekonomik yük dikkate alındığında erken tanının önemi oldukça açıktır. İleride yaşanabilecek problemler açısından öğrencilerin obeziteyle ilgili parametrelerinin tespiti ve takibi çok önemlidir. Toplum sağlığı açısından gelecekte istenmeyen sorunların önlenmesi adına öğrencilerin vücut kompozisyonlarının mevcut durumu ortaya konmalı ve belirli periyotlarla da takip edilmelidir.

Her yaşta görülebilen ve yaşa bağlı olarak artış gösteren (Yıldırım vd., 2017) obezite, günümüzde üniversiteliler arasında hızla artmaktadır. Bu artış ve neden olduğu sağlık problemleri sonucunda konunun önemini her ortamda vurgulamaya başlamıştır. Fakat modern yaşamın getirdiği yaşam tarzı değişiklikleri ve üniversite öğrencilerinde obezitiye yönelik çalışmaların az olması gibi nedenlerle bu sorunlar toplumun dikkatini yeterince çekmemektedir (Tedik ve Hacıalioğlu, 2017).

Yaptığımız araştırmada, iki yıl öncesi ve sonrası değerlerde erkeklerin vücut ağırlığının aynı kaldığı, bel çevresi değerlerinin azaldığı, kalça çevresi değerlerinin azaldığı, yağ oranı değerlerinin azaldığı, kas oranı değerlerinin arttığı, bel-kalça oranı değerlerinin arttığı, vücut kitle indeksi değerlerinin azaldığı tespit edilmiştir. Kızların ise vücut ağırlığının azaldığı, bel çevresi değerlerinin azaldığı, kalça çevresi değerlerinin azaldığı, yağ oranı değerlerinin azaldığı, kas oranı değerlerinin arttığı, bel-kalça oranı değerlerinin azaldığı, vücut kitle indeksi değerlerinin azaldığı tespit edilmiştir (Tablo 5). Çalışma bulgularımız literatürle benzerlik göstermektedir.

Ergün ve Erten (2004), Ankara Tıp Fakültesi 2. Sınıf öğrencileri üzerinde yaptıkları araştırmada, erkek ve kadın öğrenciler arasında obezitenin belirlenmesine yönelik ağırlık, boy uzunluğu, ve VKI değerleri ve bel çevresi incelendiğinde öğrencilerin, VKI'ne göre % 10,5 kadarının fazla kilolu ve % 1,5'unun obez olduğunu tespit etmiştir. Bel çevresine göre obezite kadınlarda %3,1 erkeklerde ise %1,4 bulunmuştur. Kuyumcu (2007) Ankara Üniversitesi Tıp Fakültesi 1. ve 6. Sınıf öğrencilerinde vücut kitle indeksi değişimlerini incelediği çalışmasında 1. sınıfta %12.2 olan preobezite 6. sınıfta %18.4'e çıkmış olup, 1. sınıfta obezite %3.1 iken 6. sınıfta %3.8 olmuştur. Tedik ve Hacıalioğlu (2017), yaptıkları çalışmalarında hemşirelik öğrencilerinin BKİ'lerine göre incelendiğinde; yüzde 65'inin normal kilolu, yaklaşık yüzde 19'unun fazla kilolu, yüzde 16.2'sinin ise obez olduğu saptamıştır. Bu doğrultuda risk altındaki fazla kilolu öğrencilerin erken tanı ile belirlenmesi ve bu öğrencilerde sağlıklı yaşam biçimi davranışlarının olumlu yönde geliştirilerek obezitenin önlenmesini tavsiye etmiştir. Yıldırım vd. (2017) üniversite öğrencilerinde yaptıkları araştırmada ise BKİ değerlerine göre kadınların %24,87'sinin erkeklerin %33,53'ünün normalin üstünde vücut ağırlığına sahip olduklarını, bel çevresi değerlerine göre kadınların % 40.67'si, erkeklerin %20.81'i riskli grupta olduğunu, vücut yağ yüzdesi değerlerine göre kadınların 30.62'sinin erkeklerin %20.23'ünün riskli grupta olduğunu tepit etmişlerdir. Yılmaz ve Aksoy (2018), yaptıkları çalışmalarında hemşirelik öğrencilerinin % 23.2'sinin BKİ değerlerinin 25.0-40.0 arasında olduğunu ve kilolarından dolayı kendilerini damgaladıklarını belirlemiştir. Korkmaz vd. (2019) da yaptıkları çalışmalarında hemşirelik öğrencilerinin %19.1'inin fazla kilolu, %9'unun ise obez olduğunu ve öğrencilerin sağlıklarını korumak ve geliştirmek için eğitim programlarının oluşturulması gerektiğini vurgulamıştır.

Sonuç olarak; Gönüllülerin iki yıllık sürenin başında ve sonunda ölçülen parametreleri arasında artmalar ya da azalmalar görülmüştür. Hem kızlarda hem erkeklerde vücut kitle indeksi değerlerinin azalarak normalleştiği, hem kızlarda hem de erkeklerde bel-kalça oranının risk grubunda olduğu ve kızların bel çevresi değerlerine göre riskli grupta oldukları saptanmıştır (Tablo 2, 3, 4). Sağlık açısından önemli belirteçler olan bu parametrelerin ileriki yıllarda yaşanabilecek sağlık sorunları açısından takibinin ve gerekli tedbirlerin alınmasının önemi ortaya çıkmıştır. Henüz rutin yaşamlarını devam ettirirken risk altında kalan hemşirelik bölümü öğrencilerinin sağlıklı yaşam biçimi davranışları sergilemeleri gerekmektedir. Sağlığı korumaya ve geliştirmeye yönelik topluma hizmet verecek olan hemşirelik bölümü öğrencilerinin hem sağlıkları hem de toplumsal rolleri açısından vücut kompozisyonları konusunda daha dikkatli olmaları gerektiği kaanatindeyiz.