

# Body Weight and Its Association With Weight Perception, Eating Problems and Physical Activity in University Students

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## ABSTRACT

**Aim:** The aim was to explore the relationship between body mass index and weight perception, eating problems and physical activity in university students.

**Material and Methods:** This cross-sectional descriptive study was carried out amongst undergraduate students (n= 491) from a state university. The Eating Attitudes Test, International Physical Activity Questionnaire and a demographic information form were utilized for data collection. The descriptive statistics, independent sample t-test, one-way ANOVA test and chi-square test were adjusted for data analysis.

**Results:** 21% of the students were overweight. Weight perception, weight control behaviours, life satisfaction and eating attitudes differed among underweight, normal-weight, and overweight students (p < 0.05).

**Conclusion:** The overweight students were at an increased risk of weight misperception, weight loss efforts, life dissatisfaction and eating problems. Prevention efforts should focus on improving eating patterns, physical activity and mental health among students.

**Keywords:** Body mass index, eating problems, physical activity, weight perception

## ÜNİVERSİTE ÖĞRENCİLERİNDE VÜCUT AĞIRLIĞININ KİLO ALGISI, YEME PROBLEMLERİ VE FİZİKSEL AKTİVİTE İLE İLİŞKİSİ

### ÖZET

**Amaç:** Üniversite öğrencilerinde vücut kitle indeksi ile kilo algısı, yeme problemleri ve fiziksel aktivite arasındaki ilişkiyi açıklamaktır.

**Gereç ve Yöntem:** Kesitsel ve tanımlayıcı bu çalışma, bir devlet üniversitesindeki öğrenciler (n=491) ile yürütülmüştür. Veri toplamak için Yeme Tutum Testi, Uluslararası Fiziksel Aktivite Ölçeği, ve demografik bilgi formu kullanılmıştır. Veri analizi için tanımlayıcı istatistikler, bağımsız gruplarda t- testi, tek yönlü anova testi ve ki-kare testi kullanılmıştır.

**Bulgular:** Öğrencilerin %21'i fazla kilolu idi. Düşük kilolu, normal kilolu ve fazla kilolu öğrenciler arasında kilo algısı, kilo kontrol davranışları, yaşam memnuniyeti ve yeme tutumları bakımından fark bulunmuştur (p < 0.05).

**Sonuç:** Fazla kilolu öğrenciler yanlış kilo algısı, kilo verme çabası, yaşam memnuniyetsizliği ve yeme problemleri bakımından daha risklidir. Koruyucu çabalar öğrenciler arasında yeme biçimini, fiziksel aktiviteyi ve mental sağlığı geliştirmeye odaklanmalıdır.

**Anahtar sözcükler:** Vücut kitle indeksi, yeme problemleri, fiziksel aktivite, kilo algısı

The number of overweight individuals is a growing health problem amongst adolescents and young adults, attributable to excessive caloric intake and insufficient physical activity. Recent studies suggest that 34.9–37.5% of the younger population worldwide are overweight (1, 2). Parallel to these global rates, over the past two decades the number of overweight individuals has increased in all age groups in Turkey and reaches its peak among adults (30.3%) (3). Although, according to Turkey's national health goals, the expected proportion of overweight individuals for 2017 is 25%, current results indicate that the proportion for both genders is higher than predicted. The highest percentage of overweight individuals in Turkey is found in the middle-aged bracket ( $\geq 51$  years old), while the lowest percentage is found amongst young adults (19 to 30); however, even within this bracket, the percentage remains high (7.7% in males and 13.8% in females) (3).

Overweight young people are at increased risk of becoming overweight in their later years, and experiencing serious physical and psychosocial health problems such as type 2 diabetes, cardiovascular disease, some cancers, eating disorders, depression, low self-esteem and body dissatisfaction (3). Scientific evidence exists that being overweight is a risk factor, particularly for unhealthy behaviours such as dieting, unhealthy weight control behaviours, body image discrepancy, high stress levels, low self-confidence and low physical activity levels among young people (4,5). A recent study found that in young people there is a substantial difference between actual and perceived body weight, and that misperceptions about weight lead to increases in body dissatisfaction and a concerted attempt, through different measures, to control body weight (6). Being overweight also increases the risk of mental health problems (7). There is a correlation between excess body weight and behavioural problems, eating disorders and low self-esteem (8,9). After young people gain weight, their negative eating attitudes and dissatisfaction with their bodies become more apparent, and their physical activity habits change (8).

Accurately diagnosing overweight individuals and understanding health indicators associated with being overweight are crucial for determining effective interventions with regard to young populations, preventing future weight-related problems and promoting a healthy lifestyle. Turkey has the youngest population (16.6%) in the European region (10), and more than 5.5 million young Turkish people are attending university (11). The transition from high school to university is considered a critical time for excessive weight

gain and becoming overweight. Therefore, the development of unhealthy dieting behaviours and other obesity-related behaviours in this population should be described.

To the best of our knowledge, limited studies have explored the relationship between the weight status of Turkish university students and a wide range of health indicators. Understanding of the relationship between weight status and perception, eating attitudes and physical activity on the part of university students is important in terms of developing effective health promotion interventions. Thus, the present study aimed to define the relationships between weight status and weight perception, eating attitudes and physical activity in a sample of Turkish university students.

## Materials and methods

This cross-sectional descriptive study was carried out between January and February of 2013 in a state university in southern Turkey. Data were collected from three departments (Food Science, Energy Systems Engineering, Civil Engineering) in the university. We used a convenience sample of undergraduate students taken from these departments (12). The inclusion criteria were: (i) being an undergraduate student and (ii) volunteering to participate in the study. A total of 570 students were identified as eligible to be included in the sample. Fifty-seven students reported that they were unwilling to participate, and 18 students did not complete the full set of questionnaires. In the end, 491 (86%) of the undergraduate students agreed to participate in the study and completed all the questionnaires.

The study questionnaire set consisted of a demographic information form, the Eating Attitudes Test, and the International Physical Activity Questionnaire.

### Demographic information form

The demographic information form was used to collect detailed information in terms of each student's age, gender, parental education status, accommodation status, smoking habits, alcohol use and self-reported body weight and height. It also included four questions associated with student weight perceptions: 1) weight perceptions; 2) weight control behaviours within the last year; 3) general health perceptions; and 4) perceptions of life satisfaction. Body mass index (BMI) was calculated using the following formula:  $\text{body weight (kg)}/\text{height (m)}^2$ . Based on BMI values, participants were categorized as underweight (BMI lower than 18.5), normal-weight (BMI between 18.5 and 24.9) or overweight (BMI over 25.0) (3).

### *Eating Attitudes Test (EAT-40)*

Eating attitudes were explored via the EAT-40 instrument. The scale, which was developed by Garfinkel and Garfinkel to identify eating disorders, consisted of 40 items (13). Students rated the frequency of each behaviour on a 6-point scale, ranging from 'never' to 'always'. Responses were scored between 0 and 3. The total score was obtained by summing the item scores, and ranged from 0 to 120. Scores over 30 were taken to represent very risky eating attitudes. Savaşır and Erol tested the validity and reliability of the Turkish version of the scale, the internal consistency reliability coefficient of which was determined to be 0.71 (13). The reliability of the same instrument in this study was ( $\alpha$ )=0.80.

### *International Activity Questionnaire (IPAQ)*

To determine students' physical activity levels, the self-administered IPAQ short form of the instrument was used, which was developed by Craig et al. (14). Each student's total physical activity score was calculated as the metabolic equivalent of task (MET) minutes per week by converting the time spent on vigorous activities, moderate activities and walking, to METs, which correspond to the basal metabolic rate (14). Physical activity levels were classified as low physical activity (<600 MET-min/week), mid-range physical activity (600-3000 MET-min/week) and high physical activity (>3000 MET-min/week). The reliability and validity of the Turkish version of the scale has been tested by Öztürk (14).

Written ethical approval was obtained from the administration of the university at which the study was conducted. The students were fully informed by the researcher about the study's objectives and design, before providing verbal consent. The study was conducted in accordance with ethical guidelines. The data were collected from students who had agreed to participate in the study in class during normal school hours. One of the researchers met the students during the data collection process, and confirmed that their answers would be kept confidential. The researcher also encouraged them to complete the self-reported survey unaided and in private.

All of the statistical analyses were performed using the SPSS 15.0 (SPSS Inc., Chicago, IL, USA) statistical program. The data were tested to confirm normal distribution. The demographic data and scales were summarized using descriptive statistics (i.e. the mean, standard deviation and frequency). We used an independent sample t-test to determine the BMI (mean  $\pm$  SD) differences between two groups regarding weight perception and other scale categories, and used the ANOVA test for three or more groups.

To determine the relationships between the scale categories and the BMI categories, the chi-square test was used.  $P < 0.05$  was considered to be statistically significant.

## **Results**

The students' mean age was 20.5 years (SD 2.1). Of the students, 72.3% were male, 32.4% were living in dormitories, 18.3% were smokers and 15.5% drank alcohol. A total of 51% of the students' mothers and 26.3% of fathers had five or fewer years of education. Based on self-reported weight and height measurements, 9.6% of the students were underweight, 69.4% were of normal weight and 21.0% were overweight.

Nearly a quarter of the students perceived themselves to be underweight. As shown in Table 1, 20.6% stated that they had tried to lose weight in the past year, 15.1% rated their health as excellent, and 60.3% reported they were satisfied with life. The mean BMI was significantly higher for students who perceived themselves to be overweight, who had tried to lose weight in the past year and who were completely dissatisfied with life ( $p < 0.05$ ). There was a statistically significant difference in terms of weight perception, weight control behaviours and life satisfaction ( $p < 0.05$ ) between underweight, normal-weight and overweight students. The majority of underweight students perceived themselves to be underweight, about half had tried to gain weight in the last year, more than half reported that their health was good, and very few reported that they were dissatisfied with life. Based on their statements, slightly more than half of normal-weight students perceived themselves to be of a normal weight, one third had taken no action related to their weight during the past year, slightly more than half reported that they had good health and 13.5% were dissatisfied with life. Nearly half of the overweight students perceived themselves to be overweight; half of them had tried to lose weight during the past year, a quarter reported having fair health and 18.5% were dissatisfied with life.

As indicated in Table 2, only 6.1% of the students' eating attitude scores were high and their mean BMI was significantly higher ( $p < 0.05$ ). However, the overweight students' eating attitude scores were higher than those of underweight and normal-weight students ( $p < 0.05$ ). Twenty-seven percent of the students had low physical activity levels, and there was no significant difference in the mean BMI between groups with different physical activity levels. No significant differences in IPAQ scores were observed amongst underweight, normal-weight and overweight students ( $p > 0.05$ ).

**Table 1.** Students' weight perceptions and relationship between their perceptions and BMI categories

|  | <b>BMI (kg/m<sup>2</sup>)</b> |          |               |          | <b>Actual BMI Categories</b> |                          |                        | <b>p</b> |
|--|-------------------------------|----------|---------------|----------|------------------------------|--------------------------|------------------------|----------|
|  | <b>n</b>                      | <b>%</b> | <b>M ± SD</b> | <b>p</b> | <b>Under weight (%)</b>      | <b>Normal weight (%)</b> | <b>Over weight (%)</b> |          |
| <b>Weight perception</b>                                 |                               |          |               |          |                              |                          |                        |          |
| Underweight  | 134                           | 27.3     | 19.92 ± 3.69  |          | 87.2                         | 26.4                     | 2.9                    |          |
| Normal weight  | 260                           | 53.0     | 22.76 ± 2.31  | <0.001*  | 10.6                         | 62.5                     | 40.8                   | <0.001** |
| Overweight   | 97                            | 19.8     | 26.16 ± 3.86  |          | 2.2                          | 11.1                     | 56.3                   |          |
| <b>Weight control behaviors during the last one year</b> |                               |          |               |          |                              |                          |                        |          |
| Attempts to lose weight                                  | 101                           | 20.6     | 24.86 ± 3.58  |          | 2.1                          | 17.0                     | 40.8                   |          |
| Attempts to gain weight                                  | 108                           | 22.6     | 20.52 ± 4.14  | <0.001*  | 55.3                         | 22.9                     | 3.9                    | <0.001** |
| Attempts to keep weight                                  | 102                           | 20.8     | 23.08 ± 2.52  |          | 6.4                          | 22.6                     | 21.4                   |          |
| No attempts related to weight                            | 180                           | 36.7     | 22.47 ± 3.39  |          | 36.2                         | 37.5                     | 34.0                   |          |
| <b>Health perception</b>                                 |                               |          |               |          |                              |                          |                        |          |
| Poor   | 12                            | 2.4      | 23.11 ± 6.59  |          | 4.3                          | 2.1                      | 2.9                    |          |
| Fair   | 104                           | 21.2     | 23.12 ± 4.61  | 0.459*   | 17.0                         | 20.2                     | 26.2                   | 0.591**  |
| Good   | 301                           | 61.3     | 22.57 ± 3.41  |          | 68.1                         | 61.3                     | 58.3                   |          |
| Excellent  | 74                            | 15.1     | 22.30 ± 2.97  |          | 10.6                         | 16.4                     | 12.6                   |          |
| <b>Life satisfaction</b>                                 |                               |          |               |          |                              |                          |                        |          |
| Completely dissatisfied                                  | 29                            | 5.9      | 24.89 ± 4.47  |          | 0.0                          | 5.0                      | 11.7                   |          |
| Dissatisfied   | 41                            | 8.4      | 22.80 ± 3.47  |          | 10.6                         | 8.5                      | 6.8                    |          |
| Neither satisfied nor dissatisfied                       | 125                           | 25.5     | 22.16 ± 3.00  | 0.004*   | 21.3                         | 27.6                     | 20.4                   | 0.005**  |
| Satisfied  | 237                           | 48.3     | 22.8 ± 4.13   |          | 55.3                         | 44.6                     | 57.3                   |          |
| Completely satisfied                                     | 59                            | 12.0     | 21.94 ± 2.68  |          | 12.8                         | 14.4                     | 3.9                    |          |

**BMI:** Body Mass Index; **M:** Mean; **SD:** Standart Deviation  
 \*One-way analysis of variance.  
 \*\*Chi-square test.

**Table 2.** EAT-40 and IPAQ categories and relations with BMI categories

|               | <b>Questionnaire Score</b> | <b>Questionnaire Categories</b> |          | <b>Actual BMI</b> |              | <b>Actual BMI Categories</b> |                          |                       | <b>p</b> |         |
|---------------|----------------------------|---------------------------------|----------|-------------------|--------------|------------------------------|--------------------------|-----------------------|----------|---------|
|               |                            | <b>n</b>                        | <b>%</b> | <b>M ± SD</b>     | <b>p</b>     | <b>Underweight (%)</b>       | <b>Normal weight (%)</b> | <b>Overweight (%)</b> |          |         |
| <b>EAT-40</b> | 14.75 ± 10.39              | Normal                          | 461      | 93.9              | 22.56 ± 3.66 | 0.022 ***                    | 97.9                     | 95.0                  | 88.3     | 0.023** |
|               |                            | High                            | 30       | 6.1               | 24.17 ± 4.48 |                              | 2.1                      | 5.0                   | 11.7     |         |
|               |                            | Low                             | 133      | 27.1              | 22.33 ± 4.52 |                              | 42.6                     | 25.2                  | 26.2     |         |
| <b>IPAQ</b>   | 2239.25 ± 2865.01          | Middle                          | 245      | 49.9              | 22.58 ± 3.42 | 0.166*                       | 46.8                     | 50.7                  | 48.5     | 0.081** |
|               |                            | High                            | 113      | 23.0              | 23.21 ± 3.29 |                              | 10.6                     | 24.0                  | 25.2     |         |

**BMI:** Body Mass Index, **EAT-40:** Eating Attitudes Test, **IPAQ:** International Physical Activity Questionnaire, **M:** Mean, **SD:** Standart Deviation  
 \*One-way analysis of variance  
 \*\* Chi-square test  
 \*\*\* Independent sample t test

## Discussion

In the current study, results showed that the prevalence of overweight students in the sample was 21%, while other studies conducted in Turkey have found the prevalence of overweight individuals among university students to vary between 14.2% and 15.5% (15,16). This number has been shown to be higher in developed countries. The prevalence of overweight individuals among university students is 23.1% in the United States (17) and 35% in Canada (18). The increased prevalence of overweight individuals among Turkish university students is associated with lifestyle changes; increases in the number of meals; and more frequent consumption of alcoholic beverages, caffeinated drinks, snacks, red meat and eggs (19).

The study revealed that students had unrealistic weight perceptions since the mean BMI ( $19.9 \text{ kg/m}^2$ ) of the students who perceived themselves to be underweight was in fact within normal limits. While the results indicated that the students' perceived weight was lower than their actual weight, weight misperceptions were higher among overweight students than among normal-weight and underweight students. This result supports the findings of previous studies which have indicated that university students have weight misperceptions (4,19). Weight misperceptions can also cause students to perceive themselves as being overweight. Another study reported that, although only one-tenth of university students were obese, about one-third perceived themselves to be overweight (4). In an epidemiological study comprising university students from 22 countries, only 6.1% of male students and 17% of female students were overweight; however, 25% of all students stated that they perceived themselves to be overweight (19). It has been shown that weight perceptions among university students are especially affected by gender, stress and quality of life (20).

Students' weight perceptions are closely related to their weight control behaviours. In this study, although the mean BMI ( $24.8 \text{ kg/m}^2$ ) of the students who had tried to lose weight in the past year was in the normal range, it was significantly higher than that of students in other groups who had engaged in weight control behaviours. Those who were underweight (according to the actual BMI) stated that they had tried to gain weight over the past year, and those who were overweight stated that they had tried to lose weight. In some previous studies, it has been noted that weight loss efforts among university students are affected by the students' perceptions of being overweight (4,6). In a study conducted in

Pakistan, most underweight students were satisfied with their weight and therefore did not attempt to either lose or gain weight. However, normal weight students in the same study were less satisfied with their body weight, and a quarter tried to lose weight. Similarly, very few of the overweight students were satisfied with their weight, and nearly half tried to lose weight (21). In another study conducted in Mexico, although 28.9% of the university students were overweight, 38.8% of all the students had tried to lose weight within the past year. Of these, the overweight students attempted to lose weight 3.1 times more than underweight or normal-weight students, and obese students attempted to lose weight 5.4 times more than the others. The factors affecting attempts to lose weight included being female, aesthetic concerns, the desire to protect one's physical appearance, and efforts to remain healthy (22).

In this study, no differences were determined in the health perceptions of overweight, normal-weight and underweight students. This result is consistent with previous studies, which have indicated that there is no relationship between university students' weight status and their perceptions of health (23). Moreover, the findings of the present study reveal that overweight students are less satisfied with life. Similarly, previous research has indicated an inverse relationship between adolescents' weight status and their life satisfaction, such that overweight students' life satisfaction levels were lower (24). A study conducted in the U.S. reported that obesity can cause adolescents to assess themselves negatively, and reduced their life satisfaction by causing them to establish negative perceptions of their interactions with peers, parents and school. In the study, obese adolescents stated that they perceived themselves to be less attractive, expressed their feelings less often, and had more difficulty talking with their parents than their non-obese peers. Moreover, at school, their body weight negatively influenced teachers' perceptions and expectations of them, such that teachers had lower expectations. All of these perceptions led to lower levels of life satisfaction among overweight students (25).

The findings of the present study indicate that increased body weight is associated with distorted eating behaviours; overweight students were determined to have a higher number of eating problems. Previous researchers indicated that being overweight or obese is a risk with regard to emotional eating, restrained eating, disordered eating attitudes and behaviours (26). Another previous study conducted with adolescents in Greece has also confirmed this result, reporting that eating problems are

more serious among female students, urban residents, those with family members on diets and those with BMIs above normal (27). Disordered eating behaviours and being overweight may produce a risk of health complications in youths when both factors are combined (28). Therefore, screening for abnormal eating attitudes in overweight youths may increase the success of obesity treatment programs (8). The treatment and prevention of disordered eating and being overweight share the same goals: the development of healthy eating patterns, promoting physical activity and the recognition of hunger and satiety cues (28).

The present study found no relationship between BMI and physical activity levels. Other research findings have revealed a positive relationship between BMI and physical activity levels in adolescents. Indeed, researchers followed female children for 10 years until adolescence, and determined that BMI and skinfold thickness scores were statistically higher in physically inactive as compared to physically active individuals (29). In the present study, no relationship was determined between these two variables, which confirms Pahkala, Hernelahti, Heinonen et al.'s (30) findings. The researchers revealed that the exercise levels of adolescents who had high BMIs during preschool, but later lost weight, were similar to those of adolescents who had always been thin. This finding can be interpreted as showing that BMI alone does not determine physical activity levels in adolescents.

There were some limitations to this study. Since our study was based solely on a sample of Turkish university students, and the demographic backgrounds and health behaviours of undergraduate students can vary across cultures, our data cannot be generalized to other undergraduate students in Turkey or other countries. Another limitation of this study was that the data were dependent on the students' honesty and consistency in answering survey questions. Students may have under-reported the truth when answering weight-related questions if they found the questions too sensitive.

## Conclusions

These findings addressed the increasing number of overweight university students in Turkey. The overweight students were at risk of weight misperception, weight loss efforts, life dissatisfaction and eating problems. These findings confirm the suggestion that there should be a multidisciplinary team specialized in weight-related problems at universities and support the proposal that student education programs should focus on healthy eating, exercise, types of mental health and medical services (4). Since many underweight, normal-weight and overweight students in this study had weight-related problems, attempts should be made to manage such problems and behaviours, regardless of the students' BMI. Healthy behaviours acquired during university years will positively affect both student health, and family and society health as this younger generation ages.

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