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Araştırma Makalesi– Research Paper

THE RELATIONSHIP BETWEEN EATING ATTITUDE AND BODY MASS INDEX

YEME TUTUMU İLE BEDEN KÜTLE İNDEKSİ ARASINDAKİ İLİŞKİ

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Özet

Çalışmanın amacı yeme tutumu ile beden kütle indeksi (BKİ) arasındaki ilişkiyi belirlemektir. Kesitsel çalışmada, kadınların (n=400; 18-64 yaş) vücut ağırlığı ve boy uzunlukları ölçülerek, BKİ değerleri DSÖ standartlarına göre hesaplanarak normal (18.5–24,9 kg/m^2), fazla kilolu (2,5–29,9 kg/m^2) veya obez (>30 kg/m^2) olarak sınıflandırılırmıştır. Katılımcılara yaş, cinsiyet, gelir, eğitim, medeni durum, aile büyüklüğü, sağlık ve engellilik durumu gibi demografik özellikleri içeren bir anket uygulanmıştır. Yeme bozuklukları ile ilişkili tutum, davranış ve özellikleri değerlendirmek için yeme tutum testi-40 (YTT-40) kullanılmıştır. YTT-40'tan otuz veya daha az puan alınması yeme bozukluğu riskinin olduğunu ifade etmektedir. Verilerin normal dağılıma uygunluğu Kolmogorov Smirnov testi ile değerlendirilmiştir. Elde edilen veriler Kruskal–Wallis ve Mann–Whitney U testi ile incelenmiştir. Kendall's Tau korelasyon testi ile değişkenler arasındaki ilişki irdelenmiştir. Toplamda, kadınların % 51,7'sinin düzensiz beslenme alışkanlıkları olduğu saptandı. Normal kilolu gruplarda, fazla kilolu gruplarda ve obez gruplarda yeme tutumu bozuk olan kadınların oranı sırasıyla yüzde % 4.5, %19,5 ve %27.5'tir. Obez (22.9±8.8) ve fazla kilolu kadınlar (19.7±8.4) normal vücut ağırlığına sahip kadınlara (16.8±8.6) göre anlamlı olarak daha yüksek YTT-40 puanlarına sahiptir (p<0.01). Yeme bozukluğu riski olan kadınlarda (YTT-40>30 puan) BKİ 31.5±5.7kg/m^2 iken yeme bozukluğu riski olmayan kadınlarda (YTT-40≤30 puan) BKİ'i 26.5±5.7 kg/m^2'dır. BKİ ve eğitim yılı ile EAT-40 puanları arasında doğrusal ilişki saptanmıştır (sırasıyla r=-0.146, p=0.004; r=0.622, p=0.001). Bu çalışma için Cronbach alfa değeri 0.82, önceki araştırmalarla uyumlu bulunmuştur. BKİ'si daha yüksek olan kadınlar arasında yeme bozukluğu riskinin artması nedeniyle, bu bireylerin tedavisinde dikkatli olunmalıdır. Obezite insidansı, yeme bozukluğundan etkilenmektedir.

Anahtar Kelimeler: Beden Kütle İndeksi, Yeme tutumu, Obezite

Abstract

Objective: The purpose of this study is to establish the relationship between eating habits and body mass index (BMI). In this cross-sectional study, we measured women (n=400; 18-64 years) body weight and height. BMI is calculated and classified according to WHO standards for identifying women's body weight in normal (18.5–24.9 kg/m^2), overweight (2.5–29.9 kg/m^2) or obese (>30 kg/m^2). A questionnaire was applied to eligible women's including demographic characteristics such as age, gender, income, education, home ownership, marital status, family size, health, and disability status. We used eating attitude test-40 (EAT-40) to evaluate attitudes, behaviors, and traits consorted with eating disorders. Total EAT scores under or equal thirty suggest risk of an eating disorder. The Kolmogorov Smirnov test was used to determine the normality of the variables. The obtained data were evaluated with Kruskal–Wallis and Mann–Whitney U tests. And Kendall's Tau correlation tests was used for relationship between variables. In total, 51.7 percent of the women showed criteria for eating disorders (EDs). In normal weight groups, overweight groups, and obese groups, the proportion of women with disordered eating attitudes was 4.5 percent, 19.5 percent, and 27.5 percent, respectively. Obese women (22.9±8.8) and overweight women (19.7±8.4) have significantly higher EAT-40 scores than normal women (16.8±8.6) (p<0.01). BMI was 31.5±5.7kg/m^2 in women at risk of eating disorders (EAT 40>30 points) and 26.5±5.7kg/m^2 in women who were not at risk of eating disorders (EAT 40≤30 points). BMI, schooling years, and EAT-40 scores all had a strong correlation (r=-0.146, p=0.004; r=0.622, p=0.001, respectively). The Cronbach alpha for this study was 0.82, which is in line with previous research. Because of the increased incidence of EDs risk among women with a higher BMI, particular therapeutic techniques for these patients should be considered. The incidence of obesity is influenced by EDs eating attitude problem.

Keywords: Body Mass Index, Eating Attitude, Obesity

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1. INTRODUCTION

Social pressure to get the “ideal” body is increasing, and the difference between the ideal body weight and the body weight also increases. This dynamic is recognized more by women than by men. Negative self-concept and esteem may support behaviors that lead to weight gain because men are trained not to express their body image concerns. The profusion of media in recent years has reinforced messages about one's body. Body image and self-concept are linked to body weight in men (as well as women), according to existing research and literature, and should be addressed as part of good weight management methods. Throughout life, eating habits and body mass index (BMI) are connected (Derks et al., 2018, pp. 1-9). Eating disorders, which consist of anorexia nervosa, bulimia nervosa, binge-eating, and other types of disordered eating, are a category of mental health difficulties considered by a disorder of eating behavior. Eating problems are becoming more common among women. The Eating Attitude Test 40 (EAT-40) is a commonly utilized screening tool for eating disorders. The EAT-40 scale is widely utilized in a variety of psychology areas (D. M. Garner & P. E. Garfinkel, 1979, pp. 273-279; Santonicola et al., 2019, pp. 1-7). According to the behavioral model of eating disorders, overvaluation of shape, weight, and food is a common characteristic across all eating disorders (Mares, Burger, Lemmens, van Elburg, & Vroling, 2022, pp. 1-6). Early detection and execution of preventative measures require knowledge of ED risk factors (Santonicola et al., 2019, pp. 1-7).

Women who had a greater body weight level, had more food approaching and fewer food avoidant eating behaviors, according to cross-sectional studies. Women who are overweight or obese are more susceptible to external food signals (i.e., food responsiveness), eat to a greater extent when they are upset (i.e. emotional overeating), and exhibit further desire and curiosity in eating (i.e. food pleasure) compare to the women who are of normal weight (Da Luz, Hay, Touyz, & Sainsbury, 2018, pp. 2-9; Mazzolani et al., 2021, pp. 3-9; McCuen-Wurst, Ruggieri, & Allison, 2018, pp. 96-105). BMI is the cornerstone of the current obesity classification system, and its benefits are widely used in a variety of professions, from international surveillance to individual patient evaluation (Gutin, 2018, pp. 256-271). Excess body weight (EBW) has been linked to 13 different cancer types (Lauby-Secretan et al., 2016, pp. 794-798). Obesity is a public health issue that is described as the accumulation of abnormal or excessive fat. It has been linked to both long-term and short-term physical health issues, including cardiometabolic disorders, malignancies, and mental health issues (Fruh, 2017, pp. 3-14). Adults with disordered eating attitudes can be a big concern. Obesity is to blame for the increased prevalence of disordered eating attitudes among females (Alkazemi, Zafar, Ebrahim, & Kubow, 2018, pp. 449-458). The EAT-40 is the most frequently used and thoroughly validated screening tool for eating disorders, and it is currently available in multiple languages around the world (D. M. Garner & P. E. Garfinkel, 1979, pp. 273-279; Garner, Olmsted, Bohr, & Garfinkel, 1982, pp. 871-878). Many writers have highlighted its utility in screening for people at risk of developing eating disorders and making cross-cultural social comparisons of eating attitudes in both clinical and non-clinical populations in several cultures (Savasir & Erol,

1989, pp. 19-25). Because of the high frequency of eating disorders among women with a higher BMI, it's important to focus on specialized management measures for these individuals (Öztayıncı & Özel, 2018, p. 265). Another way to automate food decisions and consumption quantities is to develop healthy habits (Thomé, Pinho, & Hoppe, 2018, pp. 590-602). Habits are cognitive connections that develop over time as people repeat a reaction (e.g., eating fruit) in response to a situational signal (e.g., after a meal) (Verplanken & Orbell, 2022, pp. 327-352). Once eating habits are established, the rehearsed response is stored in memory, and people are more likely to act on it (Gardner & Rebar, 2019, pp. 1-29). The aim of this study was to find the relationship between women's eating disorders and body mass index (BMI).

2. METHODS

We performed this research in a nutrition counselling private clinic in Istanbul between June December 2019. In this cross-sectional study, the aim is to estimate the prevalence of eating attitudes using a random sample in the prevalence of İstanbul. The level of confidence interval is 95% with a 5% margin of error. We enrolled four hundred females aged between 18 65 years. All procedures adhered to the competent committee on human experimentation's ethical requirements as well as the Helsinki Declaration of 1975, as amended in 2000. All individuals gave their informed agreement to be included in the study. We received by the T.C. Marmara University Faculty of Health Sciences Non-Interventional Ethics Committee with the approval of the Ethics Committee No. 06. Participants confirmed informed consent forms included in the study. Individuals who are under the age of 18 and older than 65, who applied before or after the specified dates, who were diagnosed with any psychological health problem before or during the study were not included in the study. We conducted a face-to-face survey comprises of two parts, including information about the demographic characteristics of the individual's age, educational status, employment status and the second part was EAT-40. The EAT-40 is a commonly used measure in the grounds of eating disorders, in mutually clinical and epidemiological studies. It was developed to evaluate a range of behaviors and attitudes about food, body weight and exercise related to anorexia (David M. Garner & Paul E. Garfinkel, 1979, pp. 273-279). To assess the body weight (kg) and body height (cm), we used the body composition analyzer scale (0–150 kg, precision 100 g) and mechanical, wall-mounted (60–200 cm, precision 1 mm), respectively. We measured participants' weight and height without shoes and socks. Participants stand with their feet together, barefoot. A horizontal Frankfurt plane is parallel to the head (below an imaginary line from the lower border of the eye orbit to the auditory meatus). We calculated body mass index (BMI) with the formula weight in kilograms divided by the square of the person's height in meters (kg/m^2) (Nuttall, 2015, pp. 117-128). BMI was evaluated in line with the World Health Organization (WHO) classification (WHO, 2021). EAT-40 is a questionnaire that assesses eating habits, attitudes, and symptoms of eating disorders in healthy people. Garner and Garfinkel (1979) created the EAT-40, which consists of forty items that assess disordered eating attitudes and behaviors. According to the EAT-40 evaluation scale, a score is ≥30 is described as a predisposition to positive eating behaviour disorder (David M. Garner & Paul E. Garfinkel, 1979, pp. 273-279). Savaşır and Erol (Savasir & Erol, 1989, pp. 18-25), carried out a validity and reliability

research, which he then translated into Turkish. Since the eating attitude test scores were over thirty and the likelihood of an eating disorder was considered high, evaluations were based on this classification. Straight and inverse scoring are as follows in the scale's scoring: Items 18, 19, 23, 27, and 39 are in the wrong order. The other questions were scored in the same way (Consecutive scoring: a=3, b=2, c=1, d=0, e=0, f=0).

2.1. Statistical Analysis

The descriptive statistics in this study were expressed as percent (%), mean (X), median, and standard deviation (SD). Because the sample size was greater than 35, the Kolmogorov Smirnov test was used to determine the normality of the variables. For statistical significance, we used a value of 0.05. The Kruskal–Wallis and Mann–Whitney U tests were used to perform non parametric tests. Kendall's Tau correlation tests were used to look at the relationship between variables. We used the IBM SPSS Statistics 22 (Statistical Package for Social Sciences for Windows 22) computer tool to calculate the data.

3. RESULTS

First, descriptive analysis was performed. Median and interquartile range of age, body weight, body height and BMI are seen in Table 1. Participants median age was 39 years. The group of positive EDs had an older age than the group of negative EDs. But there was not a statistically significant difference between age and body height of those who had a risk of EDs and those who had not (p=0.082 and p=0.905 respectively). Women who had the EDs risk negative (EAT 40 score < 30 points) had lower body weight than women who had positive EDs risk (EAT-40 score≥30 points) (p=0.001). The BMI value was statistically significantly lower in women who had negative EDs than had not (p=0.001). Most sample (n=147, 36.8%) had normal weight (BMI between 18.5 and 24.9kg/m^2), only 6 participants (1.5%) were underweight (BMI<18.5 kg/m^2), 124 participants (31%) were overweight (BMI= 25.0-29.0 kg/m^2) the remaining 123 participants (30.8%) were obese (≥30 kg/m^2) according to the classification proposed by WHO (WHO, 2021). The main statistical comparison between the groups according to EAT 40 scores (< 30 points and ≥30 points) is displayed in Table 1.

Table 1. Age and Anthropometric measurements of women according EAT-40 scores

	EAT-40			
	Negative EDs (n=193) EAT<30	**Positive EDs (n=207) EAT≥30**	**Total n=400**	**p value**
	(Median [IQR])	(Median [IQR])	(Median [IQR])	
Age (year)	38 [17]	40 [20]	39 [19]	0.082*
Body Weight (kg)	62.90 [10.75]	80.30 [17.60]	69.75 [20.35]	**0.001***
Body Height (m)	1.63 [0.1]	1.62 [0.08]	1.63 [0.08]	0.905*
BMI (kg/m²)	23.7 [3.90]	37.81 [6.40]	26.90 [7.40]	**0.001***

**Mann Whitney-U Test (p<0.05)*

BMI: Body mass index; IQR: Interquartile Range; Eds: Eating disorders; EAT-40: Eating Attitude Test-40.

A score of 30 or higher is a rough cut off for anorectic eating concerns. As seen in Table 2, we did not find the statistically significant differences between occupation, marital status and EAT-40 score (p=0.266 and p=0.597, respectively). However, education years and BMI classification were significantly associated with EAT-40 score (p=0.030 and p=0.001).

	Negative EDs (n=193) EAT<30		**Positive EDs (n=207) EAT≥30**		**Total (n=400)**	**p value**
	N	%	N	%	N	
Education Years						
<12 years	70	42.4	95	57.6	165	**0.030***
12 years ≤	123	52.3	112	47.7	235	
Occupation						
Employed	116	50.7	113	49.3	229	0.266**
Unemployed	77	45.0	94	55.0	171	
Marital Status						
Single	89	49.7	90	50.3	179	0.596**
Married	104	47.0	117	53.0	221	
BMI (kg/m²)						
Normal (18.5-24.9)	135	88.2	18	11.8	153	
Overweight (25.0-29.9)	46	37.0	78	63.0	124	**0.001***
Obese (30.0-34.9)	12	9.8	111	90.2	123	
Total	193	48.3	207	51.7	400	

***Kruskall Wallis Analysis (p<0.05); *Mann Whitney-U Test (p<0.05)*
BMI: Body mass index; Eds: Eating disorders; EAT-40: Eating Attitude Test-40.

We have stated that being overweight and obese was associated with eating disorder risk in women. The correlation of BMI classification, EAT-40 and Education years is seen in Table 3.

Table 3. The correlation of education level (year), and EAT-40 score and BMI (kg/m^2)

Subjects (n=400)	**Education (year)**		**EAT-40 score**		**BMI (kg/m²)**	
	r	**p**	**r**	**p**	**r**	**p**
Education (year)	1		-0.146	**0.004**	-0.102	**0.031**
EAT40			1		0,622	**0.001**
BMI (kg/m²)					1	

**Kendall's Tau Correlation Analysis (p<0.01). BMI: Body mass index; Eds: Eating disorders; EAT-40: Eating Attitude Test-40.*

A low level of statistically significant negative correlation was found between the years of education and EAT-40 scores (r=-0.146), (p=0.004). A low level of statistically significant negative correlation was found between the years of education and BMI values of the individuals taking part in the study (r= 0.102), (p=0.031). A positive correlation was found

between the EAT-40 scores and the BMI values (r=0.622), (p=0.001). All the correlations were statistically significant.

Table 4. Univariate and multivariate logistic regression analyses of the predictors for EDs according to EAT-40 in this study (n = 400)

Variables	Negative EDs (n=193) EAT<30	Positive EDs (n=207) EAT≥30	p value	Univariate logistic regression (crude OR [95% CI])	Multivariate logistic regression (adjusted OR [95% CI])
Education Years					
<12 years (reference)	70	95	**0.004***	1.80 (1.21-2.70)	
12 years ≤	123	112			
Marital Status					
Single (reference)	89	90	0.624	0.90 (0.61-1.34)	
Married	104	117			
Occupation					
Full-time working (reference)	116	113	0.273	0.80 (0.53-1.19)	
Non-working	77	94			
BMI (kg/m^2)					
Normal (reference)	135	18	**0.032***		
Overweight	46	78			0.01 (0.007-0.032)
Obese	12	111			0.18 (0.091-0.378)

**Refer to statistically significant P values; The Cox proportional hazard model was used to find out that had a significant influence on overall survival. p<0.05 was considered as a statistically significant difference.*
OR: Odds ratio; CI: Confidence Interval; BMI: Body mass index; SD: Standard deviation; EDs: Eating disorders; EAT-40: Eating Attitude Test-40.

As shown in Table 4, the analysis of logistic regression showed that the independent predictors of EDs were education years (adjusted odds ratio [OR]: 1.80), full time working (adjusted odds ratio [OR]: 0.80), marital status (adjusted odds ratio [OR]: 0.90) and increased body weight (adjusted odds ratio [OR]: 0.10 for overweight and [OR] 0.18 for obese). In clinical and general population samples, research has shown that the EAT-40 has enough internal consistency, with Cronbach's alpha coefficients ranging from 0.79 to 0.94 across investigations (Alvarez-Rayón et al., 2004; Pereira et al., 2008; Rivas, Franco, Bersabé, & Montiel, 2013). The Cronbach alpha for the present study was 0.82, which is consistent with prior studies. Overall, this study highlights the importance of internal consistency and reliability.

4. DISCUSSION

People's body image is frequently assessed by asking them to estimate their contentment with their weight and look; the discrepancy between their actual and ideal body image is used to determine body dissatisfaction (Royall Dawna MSc, 2012, p. 56). In this cross-sectional study, we appraised the relationship between EDs and BMI in a community sample of 400 women in Istanbul. Women's BMI appeared to be a strong indicator of behavior and attitudes and symptoms of disorders in eating behavior. The university and adolescent period, which is considered as the period of adolescence and transition to adulthood, is the period in which healthy eating habits are formed, physical growth is the fastest, nutrition habits change, and many slimming diets are applied (Sogari, Velez-Argumedo, Gómez, & Mora, 2018, pp. 2-12). Moreover, EDs appear common in middle-aged women, with a preponderance of binge eating disorder and eating disorder not otherwise specified diagnoses as compared to the "classical" diagnoses of anorexia and bulimia nervosa (Mangweth-Matzek et al., 2014, pp. 320-324). A research on middle-aged and older women's body dissatisfaction discovered that media and cultural pressures, BMI, and aging, among other factors, all contribute to body dissatisfaction in this age group (Marshall, Lengyel, & Utioh, 2012, pp. 241-247). We selected the focus group aged between 18-64 years old (39.02 ± 12.08) since we aimed to obtain women's BMI, allowing us to examine their eating behaviors. The mean age of participants was intimately similar to that of similarly aged women in Turkey's general population (TUIKSTAT, 2020). In our study, the age of women did not change statistically significantly according to the EAT 40 score. The other main finding of this study about body weight and EAT-40 relation shows that BMI was highly positively and statistically significantly correlated with the EAT 40 score. A systematic review has shown that in eating disorders, BMI is used to indicate low body weight (Melissa et al., 2020, pp. 3-7). However, in this study, we found that body weight was significantly higher in women who had EDs risk positive than in the negative group. Obesity is a complicated, multifaceted, and avoidable condition that affects over a third of the world's population today, coupled with being overweight. If current trends continue, over 38% of the world's population will be overweight by 2030 and 20% of obese (Chooi, Ding, & Magkos, 2019, pp. 6-10). Of 153 (38.3%) women the BMI range was 18.5-24.9 kg/m², which is normal according to the WHO classification. In this study, 124 (31%) of the women were overweight (BMI=25 29.9 kg/m²) and 123 (30.7%) were obese with a BMI over 30kg/m². Since EAT-40 measured the abnormality of eating attitude, it is not surprising to see this correlation in the overweight and obese groups. Eating disorders are more common among women. These results are coherent with the existing literature about the relationship between BMI and eating disorders, especially in women (Köse & Tayfur, 2021, pp. 1-11). In this study, the education level of women was slightly higher than Turkey's average (TURKSTAT, 2020). This study found that EDs were more common among highly educated persons, regardless of their educational degree. This was in line with the findings of Ladawi et al. (Eladawi, Helal, Niazy, & Abdelsalam, 2018, pp. 50-55) who found that highly educated girls from higher social strata had more EDs. Also, there is an extremely low negative statistically significant correlation between education level (years) and the EAT-40 score (=-0.146; p=0.004). Moreover, between education level (year) and BMI (kg/m^2) there is an exceptionally low negative statistically significant correlation between

education level (years) and EAT-40 score (=-0.102; p=0.031). Moreover, factors associated with EAT-40 were evaluated by bivariate or multivariate analysis in Table 4. The effects were seen to be greater in the education year [OR:1.80 CI: (1.21-2.70), p=0.004]. A systematic review and meta-analysis have shown nutrition students appear to be at higher risk for EDs (Trindade, Appolinario, Mattos, Treasure, & Nazar, 2018, pp. 179-187). We found that higher educational status influences body weight among women. According to the results of the Turkish Family Structure Survey: Findings, Suggestions, conducted by the Ministry of Family and Social Policies in 2013, it was determined that 34.9% of Turkey's population is single and 65.1% were married (MFSS, 2020). 55.3% of the 400 individuals participating in our study were married and 40.5% were single, and these results show parallelism with the results of the ministry's study. In general, recent studies have looked at the association between married status and the risk of EDs, with results that are comparable to ours. Patients in EDs who live with a partner present with more eating symptomology and psychopathology (Ali, Hori, Kim, & Kunugi, 2021, pp. 3-10). However, we could not find a statistically significant difference between single and married women who had a positive EDs risk and those who did not. It's worth mentioning that patients in our study who were living with a spouse had a higher average age [Mean±SD values of age (year) for single and married individuals respectively: 36.75±13.07, 40.85±10.90, p=0.001]. The stress of married life could be the cause of the link between marital status and EDs. However, we could not find it. The reasons can change among women. For instance, not all women have to be under stress or anxiety because of marital status. This study has some limitations. First, although the study had a large sample size, it included only women. Second, is the shortage of the assessment of social life of women. Last, the predictors of EDs did not investigate the subgroup’s anorexia nervosa, bulimia nervosa, and binge-eating syndrome.

5. CONCLUSION

The high prevalence of eating disorders risk among women who had a higher BMI should pay attention to specific management strategies targeting those patients. While BMI was ascending, the increasing EAT-40 score goes with this, suggesting that eating attitude disorders compel the prevalence of obesity. It must be noted that our findings suggest that eating attitudes and behaviors should be evaluated before obesity management with a multidisciplinary approach while arranging proper treatment.

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