

The relation between eating behaviours and obsession among university students

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Summary. *Aim:* To investigate the relation between obsession and eating behaviours among university students including some factors that affected this relation. *Methods:* This cross-sectional study was conducted with 1754 university students. The study sample was selected using the stratified sampling method. Basic demographic data were collected. Eating attitudes were determined using the Eating Attitude Test (EAT)-40, and obsessive-compulsive behaviours were determined using the Maudsley Obsessive Compulsive Inventory (MOCI). Anthropometric measurements were also examined. *Results:* Females (16.2%) were observed to have higher risks of eating disorder than males (11.4%) ($p < 0.05$). Eating disorder risk was also higher among students in the educational sciences (20.4%), health sciences (14.4%), applied sciences (11.8%) and social sciences (10.4%) ($p < 0.05$). A positive relation was found between eating behaviour and obsession ($r = 0.337$, $p < 0.001$). *Conclusion:* The study found a relationship between eating behaviour and obsession. It also concluded that gender and education were the factors that affected eating behaviour and obsession.

Key words: eating behaviours, eating disorders, obsession, obsessive-compulsive disorder, university students

Introduction

Eating disorders are defined by the 10th revision of the International Classification of Disorders (ICD)-10 as “behavioural syndromes associated with physiological disturbances and physical factors” (1). Research has shown that eating disorders are related with distress, functional impairment, depression, suicide attempts, anxiety disorders, substance abuse, increased obesity risk and morbidity (2). According to the Diagnostic and Statistical Manual of Mental Disorders (DSM)-V, eating disorders are classified as Anorexia Nervosa (AN), Bulimia Nervosa (BN) and Binge Eating Disorder (BED). AN is characterized by the maintenance of a body weight below a minimum level that

is considered to be normal for the relevant age, gender, developmental state and physical health; the practice of sustained energy intake restrictions; extreme fear of weight/fat gain; and the feeling of distress about self-perceived weight/shape. BN is described as recurrent episodes of binge eating, recurrent improper compensatory behaviours to prevent weight gain and excessive preoccupation with body image (shape/weight). Binge eating involves the consumption of larger amounts of food within a short period of time than most people consume within the same time period. A diagnosis of BED is based on the recurrence of binge eating episodes at least once a week for 3 months (3). Eating disorders are observed in 5-10% of young people (4). Approximately 90% of eating disorder cases are observed

among people under the age of 25 (5), the peak age for AN is between 15-18 (6). The lifetime prevalence of AN and BN among females can be 4% and 2% at the most, respectively (7). The risk of an eating disorder can be associated with familial, biological, social and cultural factors. Additionally, other psychiatric disorders, such as depression, anxiety, and obsessive-compulsive disorder (OCD), also increase the risk of an eating disorder (4). A cross-sectional study conducted with 1960 females showed that frequent use of Facebook further increased the risk of eating disorders, and state anxiety compared to other online activities (8).

ICD-10 defines OCD as “recurrent obsessional thoughts or compulsive acts”. This definition is retained in ICD-11. OCD is equally common among males and females. It usually emerges in childhood or early adulthood (9). The prevalence of OCD among children and adolescents is 1-3%. Body dysmorphic disorder, AN, BN and binge eating are considered to be OCD spectrum disorders (10). Thus, OCD and AN have similar cognitive, behavioural and personality pathologies (11). This relationship can be better explained through phenomenological, neurobiological and family studies. Personality disorders, mood disorders, anxiety and OCD are comorbidities of eating disorders while obsession and perfectionism are predisposing factors for OCD (12, 13). AN- and OCD-related comorbidities are frequently observed (14). Clinical studies have shown that the prevalence of OCD is high among individuals with AN, and vice versa. OCD is the most common anxiety disorder of AN and BN. Almost 40% of patients with BN and 10-60% of patients with AN have OCD excluding food obsession and compulsions (15). Stress and anxiety levels tend to increase during university life, therefore eating problems can emerge. This is particularly the case for students who have competitive or perfectionist characteristics (16). This study aimed to determine the relation between obsession and eating behaviours among university students.

Material and Methods

Participants

The study was conducted between February and April, 2013 with the voluntary participation of

1754 students. Of them, 760 were females (mean age: 21.3±2.3 years) and 994 were males (mean age: 22.2±2.6 years). The students were between the ages of 17 and 33 and studied at Near East University in Nicosia, North Cyprus. The sample was determined using the stratified sampling method which was based on the selection of students from different academic departments categorized into four main education fields.

Data collection

The study data were collected through a questionnaire and face-to-face interviews. Basic demographic data (e.g. age, gender, education field), eating attitudes, obsessive compulsive behaviours and anthropometric measurements were examined.

Eating Attitude Test (EAT)-40

EAT-40 was developed by Garner and Garfinkel to assess eating disorder risk. The test consists of 40 items, arranged on a 6-point Likert scale, with responses ranging from “always” to “never”. The test scores range between 0 and 120 points. Test scores of 30 and above indicate high risk (abnormal eating behaviour) while those of below 30 indicate low risk (17). The Turkish validity and reliability of the test was tested by Savaşır and Erol in Turkey (18).

Maudsley Obsessive Compulsive Inventory (MOCI)

This inventory was designed by Hodgson and Rachman to identify obsessive compulsive indications for both healthy and psychiatric patients. The inventory includes four sub-scales: checking, washing, doubt and slowness (19). Erol and Savaşır adapted the inventory into Turkish. A fifth subscale ‘rumination’ was added into the adapted version. After applying a factor analysis, three instead of four factors were identified: washing, obsessive thinking, and slowness and control. The inventory includes 37 items and the scores range between 0-37 points. Higher scores indicate increased number of obsessive-compulsive indications (20).

Anthropometric measurements

Weight (kg) and height (cm) were obtained using standard techniques and equipment. Weight was measured using a basic digital scale, sensitive to 0.1 g, while height was measured without shoes, to the nearest 0.1

cm, using measuring tape. Body mass index (BMI) was calculated dividing weight in kilogram by height in square meter (kg/m²). The BMI cut-off points were divided into following categories: underweight (<18.5 kg/m²), normal weight (18.5-24.9 kg/m²), overweight (25.0-29.0 kg/m²) and obese (≥30.0 kg/m²) (21).

Statistical data analysis

The study data were statistically analysed using the Statistical Packages for Social Sciences (SPSS) for Windows, version 18.0. Descriptive statistics were given as mean (χ), standard deviation (SD), median (med) and interquartile range (IR) for continuous variables; and as numerals and percentages for categorical variables. The normality of data distribution was determined using the Kolmogorov-Smirnov test. This test showed that a nonparametric test should be used for analysis. To compare BMI, EAT-40, and MOCI scores according to the field of education and EAT-40 and MOCI scores according to BMI classification, Kruskal-Wallis variance analysis was used. To further compare the binary difference of these variables, Bonferroni correction of the Mann Whitney U test was used. In addition, the Mann Whitney U test was used for binary comparison of eating disorder risk groups according to MOCI and BMI classification. The differences between gender groups' BMI, EAT-40 and MOCI mean values were investigated using the Z-test. Eating disorder risk for different education fields and BMI classification were compared using the Chi-square test. Finally, the correlation between EAT-40 and MOCI scores were determined using Spearman's correlation analysis, and a scatter plot was drawn to better illustrate the correlation. A statistical significance level of $p < 0.05$ was used for all analyses.

Results

BMI, eating attitudes and obsessive behaviours of students according to gender and education fields are shown in Table 1. The mean BMI values of males and females were found to be 24.4±3.99 and 21.8±4.35 kg/m², respectively ($p < 0.001$). Figure 1a shows that eating disorder risk percentages were found to be higher in females (16.2%) than in males (11.4%) ($p < 0.05$).

Table 1. BMI, EAT-40 and MOCI scores according to sex and education fields

Sex	BMI (kg/m ²)		Z	P	EAT-40		Z	P	MOCI		Z	P
	$\chi^2 \pm S$ [med (IR)]	$\chi^2 \pm S$ [med (IR)]			$\chi^2 \pm S$ [med (IR)]	$\chi^2 \pm S$ [med (IR)]						
Male (n=994)	24.4±3.99 [24.1(4.1)]	17.1±11.95 [14.0(12.0)]	-15.918	<0.001	17.1±11.95 [14.0(12.0)]	5.331	<0.001	15.6±6.63 [16.0(9.0)]	6.440	<0.001		
Female (n=760)	21.8±4.35 [21.2(4.1)]	19.3±11.99 [16.0(13.0)]			19.3±11.99 [16.0(13.0)]			17.9±6.56 [18.0(9.0)]				
Education field				P			P			P		
Educational sciences (n=277)	22.7±3.91 [22.4(5.0)]	21.0±13.51 [17.0(13.0)]			21.0±13.51 [17.0(13.0)]			18.6±6.76 [19.0(10.0)]				
Social sciences (n=557)	23.5±3.76 ^{a,b} [23.4(4.9)]	16.7±11.66 ^b [13.0(12.0)]	25.057	<0.001	16.7±11.66 ^b [13.0(12.0)]	28.574	<0.001	16.0±6.52 ^b [16.0(10.0)]	31.336	<0.001		
Applied sciences (n=391)	23.7±5.07 ^{a,b} [23.3(4.8)]	17.7±10.79 ^b [15.0(12.0)]			17.7±10.79 ^b [15.0(12.0)]			16.3±6.82 ^b [16.0(10.0)]				
Health sciences (n=529)	22.8±4.47 [22.4(4.7)]	18.1±12.6 ^b [15.0(13.0)]			18.1±12.6 ^b [15.0(13.0)]			16.3±6.55 ^b [17.0(9.0)]				
Total (n=1754)	23.2±4.34 [22.9(4.9)]	18.0±12.01 [15.0(12.0)]			18.0±12.01 [15.0(12.0)]			16.6±6.69 [17.0(9.0)]				

^{a,b} $p < 0.05$ (Bonferroni correction Mann Whitney U test); ^c refers to statistically significant differences between health sciences; ^d refers to statistically significant differences between educational sciences; med: Median; IR: Interquartile range; BMI: Body mass index; EAT-40: Eating Attitudes Test-40; MOCI: Maudsley Obsessive Compulsive Inventory

The BMI mean values of the students in the fields of health sciences and educational sciences were lower than those in the fields of social sciences and applied sciences ($p < 0.05$) (Table 1). Higher EAT-40 scores indicate increased abnormal eating behaviours, which also refers to an increased risk of an eating disorder. Moreover, higher MOCI scores indicate increased obsessive-compulsive behaviour or increased risk of obsessive-compulsive disorder. Both EAT-40 and MOCI mean scores of the females were higher than those of the males ($p < 0.001$). In addition, the mean EAT-40 and MOCI scores of the students in the educational sciences were higher than those in other education fields ($p < 0.001$) (Table 1). The increased eating disorder risk percentages of students in the educational sciences, health sciences, applied sciences and social sciences were 20.4%, 14.4%, 11.8% and 10.4%, respectively ($p < 0.05$). The educational sciences, followed by the health sciences, had the highest percentages of students with increased abnormal eating behaviours (Figure 1b).

Underweight students had the lowest mean scores on the EAT-40 (17.8 ± 9.72), while obese students had the highest mean scores (18.9 ± 11.71). However, no statistically significant difference was observed between BMI groups ($p > 0.05$) (Table 2). The percentage of students with obesity who were at an increased risk of an eating disorder was 16.2%, while the percentage was 11.2% for underweight students ($p > 0.05$) (Figure 1c). Although EAT-40 scores were found to not be statistically different between BMI groups, overweight students had the lowest mean scores on the MOCI (15.8 ± 6.66). These scores were found to be statistically different from the MOCI scores obtained by underweight, normal weight and obese groups ($p < 0.05$) (Table 2).

The total MOCI score and its subscale scores were determined to be higher among the group with increased abnormal eating behaviours compared to the group with lower abnormal eating behaviours ($p < 0.001$) (Table 3). A positive relation was observed between EAT-40 score and total MOCI score ($r = 0.337$, $p < 0.001$) (Figure 2). A positive relation was also observed between EAT-40 score and MOCI subscale scores ($p < 0.001$) (Table 4).

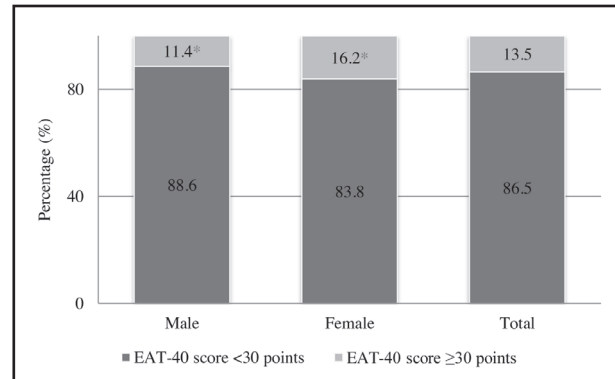


Figure 1a. Eating disorder risk percentages according to sex * $p < 0.05$. EAT-40: Eating Attitudes Test-40

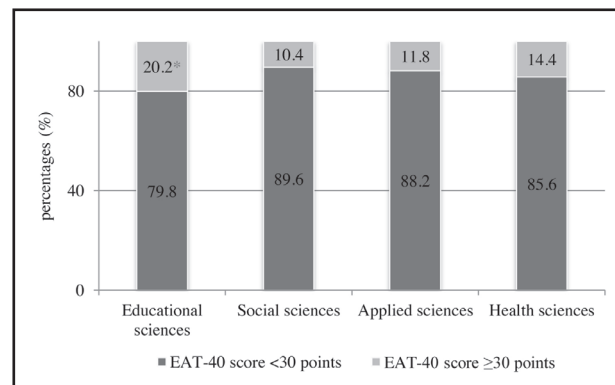


Figure 1b. Eating disorder risk percentages according to education fields. * $p < 0.05$, refers to statistically significant difference compare to other education fields. EAT-40: Eating Attitudes Test-40

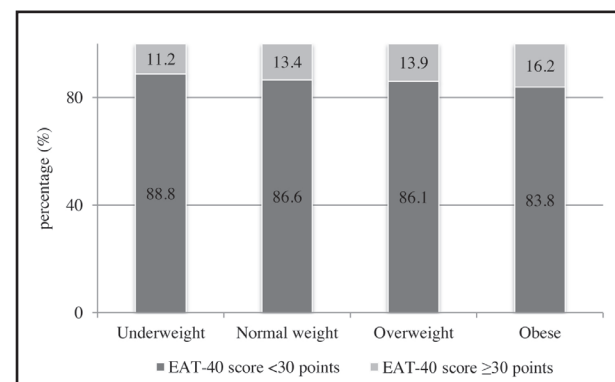


Figure 1c. Eating disorder risk percentages according to BMI classification. EAT-40: Eating Attitudes Test-40
BMI: Body Mass Index

Table 2. EAT-40 and MOCI scores according to BMI classification

	EAT-40 $\chi^2 \pm S$ [med (IR)]	χ^2	p	MOCI $\chi^2 \pm S$ [med (IR)]	χ^2	p
Underweight	17.8±9.72 [16.0(10.2)]			17.5±6.89* [18.0(9.2)]		
Normal	18.0±12.25 [15.0(12.0)]	2.377	0.498	16.7±6.64* [17.0(9.0)]	8.642	0.034
Overweight	18.0±12.10 [15.0(13.0)]			15.8±6.66 [16.0(10.0)]		
Obese	18.9±11.71 [15.5(11.0)]			17.5±6.87* [18.0(9.0)]		
Total	18.0±12.01 [15.0(12.0)]			16.6±6.69 [17.0(9.0)]		

*MOCI scores of overweight students differ among other BMI classification groups ($p < 0.05$, Bonferroni correction Mann Whitney U test); med: Median; IR: Interquartile range; EAT-40: Eating Attitudes Test-40; MOCI: Maudsley Obsessive Compulsive Inventory

Table 3. MOCI scores according to eating disorder risk percentages

	EAT-40 <30 point $\chi^2 \pm S$ [med (IR)]	EAT-40 ≥30 points $\chi^2 \pm S$ [med (IR)]	χ^2	p
MOCI Total score	16.0±6.64 [16.0(10.0)]	20.4±5.66 [20.0(7.0)]	-9.557	<0.001
MOCI Subscales scores				
MOCI Rumination	3.5±2.40 [3.0(3.0)]	4.9±2.07 [5.0(2.0)]	-8.344	<0.001
MOCI Doubt	3.7±1.42 [4.0(2.0)]	4.1±1.45 [4.0(2.0)]	-4.268	<0.001
MOCI Slowness	2.4±1.65 [2.0(3.0)]	3.4±1.69 [3.0(3.0)]	-8.015	<0.001
MOCI Washing	4.9±2.32 [5.0(4.0)]	6.0±2.27 [6.0(3.0)]	-6.873	<0.001
MOCI Checking	3.1±2.25 [3.0(4.0)]	4.5±2.13 [4.0(3.0)]	-8.788	<0.001

med: Median; IR: Interquartile range; EAT-40: Eating Attitudes Test-40; MOCI: Maudsley Obsessive Compulsive Inventory

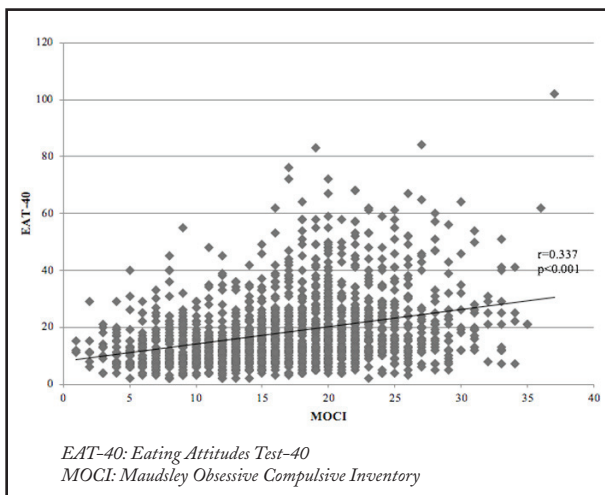


Figure 2. Correlation among EAT-40 and MOCI scores. EAT-40: Eating Attitudes Test-40. MOCI: Maudsley Obsessive Compulsive Inventory

Discussion

Eating disorders are more common among young people and females than in males (5). The reasons for eating disorders are complex and not well understood.

Table 4. EAT-40 and MOCI scores correlation

	EAT-40 score	
	r	p
MOCI Total score	0.337	0.000*
MOCI Subscales' scores		
MOCI Rumination	0.269	0.000*
MOCI Doubt	0.201	0.000*
MOCI Slowness	0.3	0.000*
MOCI Washing	0.25	0.000*
MOCI Checking	0.298	0.000*

EAT-40: Eating Attitudes Test-40

MOCI: Maudsley Obsessive Compulsive Inventory

Nonetheless, genetic predisposition and social, familial, psychological and biological factors were revealed to influence the risk of eating disorders (7, 22). In the present study, the EAT-40 mean scores of the females (19.3±11.99) were higher than those of the males (17.1±11.95) ($p < 0.001$). These results were similar to those of a pilot study conducted in 2011 with 152 students at the same university. In this pilot study, the EAT-40 mean scores of the females (19.1±12.34) were found to be higher than those of the males (17.0±10.07) but the difference was not statistically significant ($p > 0.05$).

(23). In another study, EAT-40 mean score was found to be 18.67 ± 11.30 for female students, and 16.79 ± 10.73 for male students ($p < 0.05$) (24).

The present study found that 13.5% of the students were at higher risk, and the females (16.2%) were observed to be at higher risk than the males (11.4%). Similarly, three different studies conducted with university students in Turkey reported an increased risk of eating disorders at the rates of 13.3%, 13.8%, and 14.0%, respectively, among the students (25-27). In France, the prevalence of eating disorders among university students is also high (20.5%) and is associated with stress, depression and other behaviour risks (28). During university education, challenging factors regarding courses, increased responsibilities and higher self-demand can potentially lead to the development of stress and depression among students.

Moreover, the social emphasis on body image and body shape affects the body weight perception of young people. In Western culture, the image of ideal beauty is associated with being thin, which results in the engagement in different weight loss activities and an increased risk of eating disorders (29). The spread of this image of ideal beauty through Western advertising can influence the conception of Eastern body ideals (30, 31). A study comparing the risk of eating disorders among college students in the United States and the Philippines showed that Filipino students had a 10.9 times higher risk of eating disorders compared to American students (32). In a different study, female university students in the United States demonstrated more body dissatisfaction than Bosnian female university students (33). Another study reported that university students in Japan, compared to those in Korea, had a more pronounced desire to have lower body weight than their actual weight (34). These results indicate that cultural beliefs and attitudes influence the development of eating disorders. Moreover, some ethnic groups or regions have higher prevalence of eating disorders (35, 36).

Both EAT-40 and MOCI mean scores of the students in the educational sciences were higher than those of the students in other fields. The percentages of students with an increased eating disorder in the educational sciences, health sciences, applied sciences and social sciences were 20.4%, 14.4%, 11.8% and 10.4%, respectively ($p < 0.05$). A study conducted in Turkey

reported that the mean EAT-26 scores of students in the social sciences (16.34 ± 7.43) and health sciences (17.64 ± 8.02) were similar and below the risk cut off point ($p < 0.05$) (37). Another study from Turkey found that 8.4% of fine arts students had an increased risk of eating disorders. In a study from Pakistan, 23.3% of business students were reported to have the same risk (38, 39). A study on eating behaviours of students in different study fields, conducted in Turkey again, considered the eating behaviour risk to be higher among students in physical education and sports (10.7%) compared to nutrition and dietetics (2.9%) and social sciences (0.4%) ($p < 0.05$) (40). Studies on eating disorder risk with respect to education field, conducted in various countries, have largely focused on students in health sciences, particularly medical and nursing departments. The percentages of eating disorder risk among health sciences students in various countries were reported to be 22.7% in Pakistan, 15.3% in Turkey, 10% in Brazil, and 7.8% in India (38, 41-43). These data suggest a relationship between education field and eating behaviour implying that eating behaviour within the same education field varies by country. Therefore, eating behaviour can be associated with cultural and ethnic differences.

The difference between genders regarding the risk of eating disorders is also an important issue. In the present study, the mean BMI values of male students were higher than those of the females ($p < 0.001$), and the percentages associated with the risk of eating disorders were higher in the females (16.2%) than in the males (11.4%). Other studies also suggested a relationship between the risk of eating disorder and gender, and revealed different results. For example, some indicated that the risk of eating disorders was higher among female students than among males, while others suggested the opposite. However, no statistical significance was found in the latter case (25, 27). Other studies conducted with university students in Turkey showed that the eating disorder risk of female students was higher than that of male students ($p < 0.05$) (44; 45; 46). Eating disorders are highly prevalent, and female students are at higher risks of eating disorders than males in China (9.9% females, 2.0% males), Sarawak, Malaysia (13.7% females, 5.6% males), Spain (20.85% females, 14.9% males) and Bangladesh (40.2% females, 34.3% males) (47-49). Furthermore, a study conducted in Ja-

pan reported that 5-10% of female students had eating disorder symptoms, and the increasing prevalence of eating disorders among female students was thought to be associated with body perception and the fear of weight gain (50, 51). The difference between genders regarding the risk of eating disorders can be attributed to the fact that females place greater importance to body image and aesthetics than males (52). The risk of eating disorders is associated with self-esteem, family history, child abuse and neglect (53).

Eating disorders among female university students are also associated with weight-related teasing (54). Various studies indicate that underweight and overweight individuals, and those with obesity have an increased risk of eating disorders. In this study, underweight students had the lowest mean EAT-40 score (17.8 ± 9.72), while students with obesity had the highest mean EAT-40 score (18.9 ± 11.71). However, the difference was not statistically significant between BMI groups ($p > 0.05$). Furthermore, the percentage of students with obesity who had an increased risk of eating disorders was 16.2%, while the percentage was 11.2% for underweight students ($p > 0.05$). In a pilot study conducted in 2011 with 152 students at the same university, 18.2% of underweight and 13.5% of overweight students had an increased risk of eating disorders. These results support the present study ($p < 0.05$) (23). Another study reported that 17.2% of underweight and 21.2% of overweight university students had a higher risk of eating disorders (44). In a study conducted with university students, eating disorder risks of overweight students, and those with obesity were two times higher than those of normal weight students, and the risk of eating disorders among underweight students were 2.9 times lower than those of normal weight students (24). However, another study conducted with university students found no statistical difference between BMI groups with respect to eating disorders (26). In addition to body dissatisfaction and dieting, BMI is also considered to have an effect on the risk of eating disorders. Studies show that increased BMI indicate higher likelihood of body dissatisfaction and dieting (55, 56).

Obsessive-compulsive behaviours and BMI are considered to be main predictor variables of increased abnormal eating behaviour among female university students (57). Therefore, in addition to BMI, other psycho-

logical factors can affect eating behaviour. For example, depression, anxiety, anger, stress, and sadness are known to negatively affect eating behaviour. A study conducted with university students found that eating disorders and subjection to weight-related teasing resulted in psychological distress (58). Personality traits play a key role in the comorbidities associated with eating disorders and obsessive-compulsive disorder (59). Personality attributes, such as perfectionism and impulsivity, also have an impact on obsessive-compulsive disorders and eating behaviours. Although obsessive-compulsive disorders and eating disorders are in different categories, they are considered to have mutual predispositions (13). Eating disorders mainly include food- and weight-related obsessive compulsive dietary restrictions (11). In this study, total/subscale MOCI scores were higher among the students included in increased abnormal eating behaviour group compared to those in lower abnormal eating behaviour group ($p < 0.001$). There was a positive relation between the EAT-40 score and total/subscale MOCI scores ($p < 0.001$). A study conducted with nursing students found a positive correlation between EAT-40 score and total MOCI score, which supported present study (60). A study conducted with patients who had obsessive-compulsive disorder reported increased abnormal eating behaviours among them (61). Perfectionism and obsession are associated with increased eating disorder disease symptoms (15). Another study conducted in Turkey reported that the most common comorbidity of eating disorders was obsessive-compulsive personality disorders (62).

Conclusions

This study indicated that female university students had higher tendency to abnormal eating behaviours and obsessions than males. Furthermore, students in the field of educational sciences, followed by students in the health sciences, had the highest risks of eating disorders. Students with higher levels of abnormal eating behaviour also had higher levels of obsession compared to students with lower levels of abnormal eating behaviour. In conclusion, a relationship was found between eating behaviour and obsession. Gender and education field were also considered to be the factors that affected eating be-

haviour and obsession. Although there are studies on the relationship between gender, and eating behaviours and obsession, further studies are needed on the reasons of the differences in the education fields.

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