

# Mindful eating questionnaire: eating control, emotional eating and conscious nutrition trio

Gizem Kose<sup>1</sup>, Ertugrul Ciplak<sup>2</sup>

<sup>1</sup>Department of Nutrition and Dietetics, Istanbul Kent University, Istanbul, Turkey - E-mail: drgizemkose@gmail.com; <sup>2</sup>Department of Physical Education and Sport, Zonguldak Bulent Ecevit University, Zonguldak, Turkey

**Summary.** *Objective:* Present study, it was aimed to determine the relationship between university students' mindful eating according to their age, body mass index and gender, and also to find mindful eating and subscales correlations and relationships, especially between emotional eating. *Methods:* This cross-sectional study was conducted 400 randomly selected undergraduate students in a university in Turkey. Participants completed Mindful Eating (MEQ) questionnaire that included questions related to their eating discipline, mindfulness, eating control, disinhibition, etc. *Results:* In our study, participants were aged between 18-26 and 35.0% were female and 65.0% were male, the mean BMI (kg/m<sup>2</sup>) was 22.93±2.93. There were no significant difference between participants applied with national examination and taken the talent selection in any statistical assessment (p>0.05). Mean MEQ score was 3.14±0.44 and there was no statistically significant difference between males (3.14±0.45) and females (3.14±0.43) (p> 0.05). Obese group was found to be having less MEQ scores than any other BMI classes and participants in normal weight group had the highest MEQ score (p<0.05). Obese participant found to have less disinhibition, eating discipline, emotional eating, and conscious nutrition scores (p<0.05). In correlations, when age increased, BMI (r=0.122, p=0.015), mean MEQ score (r=0.156, p=0.002), emotional eating (r=0.250, p=0.000), eating discipline (p=0.124, p=0.013), and interference (r=0.128, p=0.010) increased statistically significantly. There was strong correlation between total MEQ and subscales (p<0.01). Eating control, emotional eating, mindfulness, conscious nutrition and interference had a strong correlation (p<0.01). *Conclusion:* Young adulthood is an important stage of life to create lifelong eating and nutritional habits. With age, body mass index increases as expected, but this can lead to impair life quality. It is vital to detect mindful eating status and make an intervention about nutrition and eating.

**Keywords:** Mindful eating, mindfulness, nutrition, emotional eating, body mass index.

## Introduction

Mindful eating is an approach adapted from mindfulness to eating food with focusing internal awareness and experience (1,2). Mindful eating is useful for making healthier food choices (3), overcoming binge eating (4,5), stopping overeating (6,7), dealing emotional eating (8-10), and not only weight management but also maintenance (11). It is a known fact that weight loss with strict or calorie restricted diets is not permanent and as a result weight regain can be

inevitable. Researchers suggest mindful eating added weight management treatment programs especially for overweight and obese individuals (6,8,12).

Obesity is generally caused by overeating. Overeating has been increasing rapidly between young adults (8,11). It can be occurred by emotional or external factors. When emotional factors are formed by the influence of emotions and thoughts, external factors consist of factors such as the smell or appearance of food (13-15). Overeaters can have a meal even if they are full because of strong external factors. Meal por-

tion can be controlled by mindful and intuitive eating trainings (16). Body mass index increase has an effect on mindful eating such as decline. Because of this bi-directional effect, being overweight or obese can cause emotional and external eating (17,18). Because individuals with high BMI cannot give their attention to food and internal signals (19).

Emotional eating was found to be strongly related to overeating and becoming overweight (7). If emotional eating cannot be controlled, it can lead to weight gain in the life stream in the future. It can be seen as a negative factor in the performance of athletes (20,21) as it will negatively affect sedentary individuals' body weight management (11,12). Emotions stops disinhibition system to work properly in our brain. In some researches it was found that they have strong negative effects to each other (22, 23).

Having right knowledge about healthy nutrition and mindful eating help individuals to avoid obesity and risk factors of it in the future (24,25). To be able to consciously manage both eating attitudes and body weight, eating mindfully is an essence. Mindful eating has an anti-overeating effect on especially impulsive or automatic eating habits. Especially seeing food had the strongest effect on individuals as making them want to eat much more than other senses (15,25). If there is no self-control, automatic eating will happen. Being aware of hunger type (emotional or physical) is essential as listening internal signals, when to start and when to stop eating can stop disordered eating (16,22).

Physical activity helps to keep body mass index under control. however, in some cases it may also have an adverse effect (26). Besides, people think that doing physical activity has a ticket to unlimited food intake. When individuals make intense exercises, it can cause eating more because of some internal signal changes like leptin, ghrelin or any other agents (27). Excessive physical activity is as harmful as unlimited or over-eating, forwhy eating regularly and staying in the limits is important. Being a 'natural mindful eater' is a key to have normal eating patterns (3,22). Eating consciously may have great benefits in preventing emotional eating (28). Many researchers and studies found relationships and differences between gender, body mass index and Mindful Eating Questionnaire (1-4, 10, 16, 19, 22, 24, 26,28-33).

The main purpose of present study is to determine relationships between university students' age, gender, BMI with overall scores of Mindful Eating Questionnaire (MEQ) and the subscale scores. We hope to shed light for future studies about mindful eating for supporting young adults to be more advantageous having a healthy life than other individuals.

## Materials and Methods

In the present study, a questionnaire form consisting of 3 questions including age, gender, application information was used and body mass index that was calculated as  $\text{body weight (kg)} / \text{height}^2 \text{ (m)}$  after measurement of body weight and height. The World Health Organization classification was used for BMI classification (34). The data of the students who applied with the national examination and taken the talent selection were evaluated.

### *Mindful Eating Questionnaire (MEQ)*

Mindful Eating Questionnaire (MEQ) was developed in 2009 (1). Kose et al. (2016) adapted to Turkish as MEQ-30 The subscales were divided into seven as disinhibition (mindless eating), emotional eating, eating control, mindfulness, eating discipline, conscious nutrition and interference (3). Examples of items are "I eat healthy," and "I eat chocolate to make myself happy". The scoring of the scale is as follows: Items 1, 7, 9, 11, 13, 15, 18, 24, 25 and 27 are scored straight, and the remaining questions are scored reverse (Reverse Scoring: 1=5, 2=4, 3=3, 4=2, 5=1). In original form of MEQ cronbach's alfa, was 0.640, Turkish form was 0.733, in this study it was found 0.761.

### *Statistical analysis*

In the study, reliability tests of scale (cronbach's alfa), Student t-test, one-way ANOVA, chi-square analysis, Kolmogorov-Smirnov normality test, Mann Whitney U and Kruskal-Wallis test, Pearson and Spearman correlation analysis were used to evaluate age, BMI, the MEQ and PSQI total and score groups. Data were analyzed by using the IBM SPSS Statistics version 21 software for Windows. Significance level was taken as  $p < 0.05$ .

**Table 1. Score of scales and subscales according to gender, age and BMI classification of participants**

	Gender				Body Mass Index (BMI)					
	Male	Female	Z	p	UW	NW	PW	OW	Z	p
<b>BMI</b>	23.81±2.67	21.30±2.69	-8.834	<b>0.000*</b>	17.76±0.86	21.99±1.73	26.54±1.20	31.27±0.84	8.364	<b>0.000*</b>
<b>Age</b>	21.55±1.87	21.01±1.86	-3.037	<b>0.002*</b>	20.94±1.83	21.27±1.88	21.82±1.85	20.89±1.96	3.012	0.054
<b>MEQ</b>	3.14±0.45	3.14±0.43	-0.410	0.682	3.11±0.47	3.17±0.42	3.07±0.49	2.66±0.58	0.743	<b>0.032*</b>
<b>DI</b>	2.96±0.82	2.99±0.85	-0.448	0.654	3.03±0.91	3.04±0.81	2.75±0.84	2.51±0.82	1.245	<b>0.032*</b>
<b>EE</b>	3.41±0.99	2.81±0.94	-5.557	<b>0.000*</b>	2.64±1.09	3.26±0.98	3.17±1.07	2.62±1.19	1.174	<b>0.044*</b>
<b>EC</b>	3.26±0.79	3.43±0.85	-1.901	0.057	3.48±1.01	3.36±0.78	3.20±0.81	2.66±1.01	1.325	0.111
<b>MN</b>	3.04±0.43	3.21±0.46	-3.093	<b>0.002*</b>	3.15±0.36	3.12±0.46	3.04±0.43	2.91±0.43	2.014	0.527
<b>ED</b>	3.22±0.79	3.09±0.65	-1.430	0.153	2.77±0.78	3.20±0.71	3.24±0.81	2.30±0.74	1.349	<b>0.003*</b>
<b>CN</b>	2.96±0.48	3.29±0.52	-5.870	<b>0.000*</b>	3.50±0.62	3.07±0.48	3.01±0.56	2.95±0.67	1.765	<b>0.023*</b>
<b>IN</b>	3.21±0.94	3.31±0.94	-1.143	0.253	3.25±1.16	3.26±0.92	3.24±0.93	2.55±0.84	2.577	0.180

\*p&lt;0.05

UW: Underweight, NW: Normal Weight, PW: Pre-obese, OW: Obese, MEQ: Mindful Eating Questionnaire, BMI: Body Mass Index, DI: Disinhibition, EE: Emotional Eating, EC: Eating Control, MN: Mindfulness, ED: Eating Discipline, CN: Conscious Nutrition, IN: Interference.

## Results

In this present study, 65.0% of the participants were male, 35.0% were female and the mean age was 21.36±1.88 years. There was no significant difference between participants applied with national examination and taken the talent selection ( $p>0.05$ ). Mean body mass index (BMI, kg/m<sup>2</sup>) of total participants was 22.93±2.93; according to gender, 23.81±2.67 in males and 21.30±2.69 in females ( $p<0.001$ ). BMI classification distribution was divided into four groups in males as 0.8% underweight (UW), 69.6% normal weight (NW), 27.3% pre-obese (PW), 2.3% obese (OW) and in females as 11.4% UW, 38.0% NW, 12.3% PW, 2.3% OW ( $p<0.000$ ).

Mean scores of MEQ was 3.14±0.44, highest and lowest score of the subscales were interference (3.24±0.94) and disinhibition (2.97±0.83). Mean MEQ scores of males (3.14±0.45) and females (3.14±0.43) were so close but there was no significant difference ( $p>0.05$ ). When BMI classification evaluated, it is found that normal weight (NW) had the highest and obese group (OW) had the lowest mean MEQ score (3.17±0.42 and 2.66±0.58,  $p<0.05$ ).

It is found that males had more emotional eating than females and females had more mindfulness and conscious nutrition than males ( $p<0.05$ ). Nevertheless, the relationship with BMI is OW group had less

mean scores of all MEQ subscales than other classes ( $p<0.05$ ) and interestingly UW group got close mean emotional eating score ( $p<0.05$ ). Obese participants were found to have less disinhibition, eating discipline and emotional eating, and conscious nutrition scores compared to other BMI groups ( $p<0.05$ ).

In the present study, correlations between participants showed us while age increased, BMI ( $r=0.122$ ,  $p=0.015$ ), mean MEQ score ( $r=0.156$ ,  $p=0.002$ ), emotional eating ( $r=0.250$ ,  $p=0.000$ ), eating discipline ( $p=0.124$ ,  $p=0.013$ ), and interference ( $r=0.128$ ,  $p=0.010$ ) increased statistically significant but the relationship with other subscales were not significant ( $p>0.05$ ). There was strong correlation between total MEQ and subscales ( $p<0.01$ ).

A significant relationship was found between BMI and both eating control ( $r=-0.129$ ,  $p<0.05$ ) and conscious nutrition ( $r=-0.140$ ,  $p<0.01$ ). While conscious nutrition increases, dealing with emotional eating increased too ( $r=0.137$ ,  $p<0.01$ ). Eating control, emotional eating, mindfulness, conscious nutrition and interference had a strong correlation ( $p<0.01$ ).

## Discussion

In this present study we focused on the relationship between participants' mindful eating scores

**Table 2.** Correlations between age, BMI and MEQ, MEQ subscales (n=400)

Variables	Age		BMI		MEQ		DI		EE		EC		MN		ED		CN		IN		
	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p	
Age																					
BMI	0.122	0.015*																			
MEQ	0.156	0.002**	-0.064	0.201																	
DI	0.071	0.154	-0.067	0.180	0.800	0.000**															
EE	0.250	0.000**	0.097	0.052	0.736	0.000**	0.565	0.000**													
EC	-0.015	0.771	-0.129	0.010*	0.665	0.000**	0.445	0.000**	0.369	0.000**											
MN	0.000	0.995	-0.065	0.198	0.173	0.001**	-0.029	0.566	-0.053	0.288	0.140	0.005**									
ED	0.124	0.013*	0.022	0.667	0.296	0.000**	0.091	0.068	0.052	0.303	0.060	0.228	0.085	0.091							
CN	-0.042	0.406	-0.140	0.005**	0.486	0.000**	0.371	0.000**	0.137	0.006**	0.264	0.000**	0.047	0.352	0.067	0.182					
IN	0.128	0.010*	-0.056	0.260	0.614	0.000**	0.505	0.000**	0.413	0.000**	0.353	0.000**	-0.062	0.213	0.120	0.016*	0.269	0.000**			

\*p&lt;0.05, \*\*p&lt;0.01

MEQ: Mindful Eating Questionnaire, BMI: Body Mass Index, DI: Disinhibition, EE: Emotional Eating, EC: Eating Control, MN: Mindfulness, ED: Eating Discipline, CN: Conscious Nutrition, IN: Interference.

according to their age, gender and body mass index. Withal, our results stated some statistically significant correlations between mindful eating and all subscales.

In this study, 35.0% of the participants were female, and the mean age was  $21.36 \pm 1.88$  years (data not shown in tables). Mean scores of MEQ was  $3.14 \pm 0.44$ , highest and lowest score of the subscales were interference ( $3.24 \pm 0.94$ ) and disinhibition ( $2.97 \pm 0.83$ ).

Framson et al. (2009) studied with the original form of MEQ, found body mass index (BMI, kg/m<sup>2</sup>) ranged from 17.7 to 62.0 and mean of BMI was  $24.2 \pm 5.1$ . Similarly, Moor et al. (2013), Anderson et al. (2016), Clementi et al. (2017), Choi and Lee (2019) studied with mostly normal weight group. In a research, it was found that 50.7% of the participants were women, mean BMI was  $24.57 \pm 6.05$  kg/m<sup>2</sup> (31) and in another study classified BMI to four groups as in our study (33). In the present study, mean BMI of participants was  $22.93 \pm 2.93$ ; according to gender and classification,  $23.81 \pm 2.67$  and 0.8% underweight (UW), 69.6% normal weight (NW), 27.3% pre-obese (PW), 2.3% obese (OW) in males and,  $21.30 \pm 2.69$  and 11.4% UW, 38.0% NW, 12.3% PW, 2.3% OW in females (p<0.001) with a good consistency with other studies, conducted on mostly participants with normal weight.

#### *Mindful eating questionnaire, subscales, gender and BMI relations*

In general, it is thought that females eat more emotionally than men. Clementi et al. (2017) and Choi and Lee (2019) couldn't find any mean MEQ score difference between gender. In the present study, mean MEQ scores of males ( $3.14 \pm 0.45$ ) and females ( $3.14 \pm 0.43$ ) were so close but there was no significant difference (p>0.05). It is found that males had more emotional eating dealing than females and females had more mindfulness and conscious nutrition than males (p<0.05).

Body weight and BMI is strongly related to decreased mindful eating (8). Framson et al. (2009) stated that lower MEQ score was significantly related to obese women. Moor et al (2013) and Anderson et al (2016) could not find a significant relationship between BMI classification and MEQ. Mason et al. (2016) conducted a study on obese women and re-

ported mean MEQ score as  $2.6 \pm 0.3$ . In their study, Fung et al (2016) noticed that mindful eating status can be predictive for body weight management. Similarly, in this study, it is found that normal weight (NW) had the highest ( $3.17 \pm 0.42$ ) and obese group (OW) had the lowest mean MEQ score ( $2.66 \pm 0.58$ ,  $p < 0.05$ ). In so many studies it was found that mindful eating scores were significantly lower among obese participants ( $p < 0.001$ ) (28,32,33). Choi et al. (2019) concluded that obese individuals had more emotional eating. In another study BMI and awareness factor had a strong relationship ( $p < 0.05$ ) (33). Mason et al (2016) found that participants with high BMI had decreased emotional eating scores. Nevertheless, in this study, OW group had less mean scores of all MEQ subscales than other classes ( $p < 0.05$ ) and interestingly UW group got close mean emotional eating score ( $p < 0.05$ ). Obese participants were found to eat without thinking (disinhibition), have difficulties with meal time-order (eating discipline) and manage emotions when there is a food presence (emotional eating), and the most importantly eating consciously or nutrition knowledge (conscious nutrition) compared to other BMI groups ( $p < 0.05$ ).

#### *Correlations between MEQ, subscales, age and BMI*

Emotional eating subscale increased with age (1,23,26,28). In their study, Framson et al. (2009) stated that as the age increased, four subscales (mindfulness, disinhibition, emotional eating and external cues) increased, but MEQ and distraction subscale did not change. Choi and Lee (2019) found a relationship between age and emotional eating ( $p < 0.05$ ). In the present study, correlations between participants showed us age had a significant positive correlation with BMI, mean MEQ score, emotional eating, eating discipline, and interference ( $p > 0.05$ ) but the relationship with other subscales were not significant ( $p > 0.05$ ).

Framson et al (2009) stated that BMI and both MEQ and all subscales were negatively correlated ( $p < 0.001$ ). Additionally, Moor et al. (2013) reported a negative correlation between BMI, disinhibition and emotional eating subscales. In other studies, Grinnell et al. (2011), Moor et al. (2013), Beshara et al. (2013), Webb et al. (2018), and Choi and Lee (2019) found a negative correlation with MEQ scores and

body weight ( $p < 0.05$ ). On the other hand, some studies didn't report any significant relationship between BMI and MEQ scores ( $p > 0.05$ ) (29,31). In this study, a significant negative correlation was reported between BMI and both eating control ( $r = -0.129$ ,  $p < 0.05$ ) and conscious nutrition ( $r = -0.140$ ,  $p < 0.01$ ). It seems to be obese individuals do not have eating control when they are eating, and maybe that is why gaining weight. And because the lack of nutritional knowledge, BMI and conscious nutrition were inversely associated. These results showed us that as BMI increases, eating attitudes may impair and, it can be hard to focus on eating because of internal and external distractions. In interventional studies, Dalen et al. (2010), Daubenmier et al. (2011), Timmerman and Brown (2012), Hendrickson and Rasmussen (2013), Werthmann et al. (2016), Dunn et al. (2018), Dibb-Smith et al. (2019), and Giannopoulou et al. (2020) all stated that with nutrition education or mindful eating intervention participants lost weight, their health outcomes showed positive developments and mindful eating status increased ( $p < 0.05$ ). We can say that these participants need nutrition educations.

#### *MEQ and subscales*

Both Grinnell et al. (2011) and Beshara et al. (2013) stated a negative correlation with emotional eating and disinhibition subscales ( $p < 0.05$ ). Abaspor et al. (2018) stated that MEQ is negatively correlated with disinhibition and emotional response ( $p < 0.05$ ). Choi and Lee (2019) found strong correlation between MEQ and all subscales except external cues, and disinhibition and emotional response were positively correlated ( $p < 0.001$ ). It was concluded that mindful eating was inversely correlated with negative emotions and emotional eating ( $p = 0.0001$ ) (9). Giannopoulou et al. (2020) concluded that MEQ and all subscales are negatively correlated with binge eating ( $p < 0.05$ ) except awareness. In this study, conscious nutrition and dealing with emotional eating were positively correlated ( $p < 0.01$ ). Eating control, emotional eating, mindfulness, conscious nutrition and interference had a strong correlation, too ( $p < 0.01$ ). Besides, there was strong correlation between total MEQ and subscales ( $p < 0.01$ ). In harmony with other researches, MEQ and subscales shows good consistency. Now we

know from the studies that emotional eating can be prevented by mindful eating interventions.

## Conclusion

Young adulthood is a crucial period of life because life-long habits are started to route in exact that time. It is important to detect status of mindful eating and make an intervention for individuals. Mindful eating interventions within the framework of nutritional educations have been useful for treatments and prevention of obesity or eating related diseases.

## Acknowledgements

Special thanks to Assoc. Professor Erkut Tutkun for his intense support.

## References

1. Framson C, Kristal AR, Schenk JM, Littman AJ, Zeliadt S, Benitez D. Development and validation of the mindful eating questionnaire. *Journal of the American Dietetic Association* 2009; 109(8): 1439-44.
2. Moor KR, Scott AJ, McIntosh WD. Mindful eating and its relationship to body mass index and physical activity among university students. *Mindfulness* 2013; 4: 264-74.
3. Kose G, Tayfur M, Birincioglu I, Donmez A. Adaptation Study of the Mindful Eating Questionnaire (MEQ) into Turkish, *Journal of Cognitive-Behavioral Psychotherapy and Research* 2016; 5(3): 125-34.
4. Giannopoulou I, Kotopoulea-Nikolaïdi M, Daskou S, Martyn K, Patel A. Mindfulness in Eating Is Inversely Related to Binge Eating and Mood Disturbances in University Students in Health-Related Disciplines. *Nutrients* 2020; 12(2): 396.
5. Kristeller JL, Wolever RQ. Mindfulness-based eating awareness training for treating binge eating disorder: The conceptual foundation. *Eating Disorders* 2011; 19: 49-61.
6. Ozkan N, Bilici S. New Approaches in Eating Behavior: Intuitive Eating and Mindful Eating. *Gazi Journal of Health Sciences* 2018; 3(2): 16-24.
7. Daubenmier J, Kristeller J, Hecht FM, Maninger N, Kuwata M, Jhaveri K, et al. Mindfulness Intervention for Stress Eating to Reduce Cortisol and Abdominal Fat among Overweight and Obese Women: An Exploratory Randomized Controlled Study. *Journal of obesity* 2011; 651936.
8. Fung TT, Long MW, Hung P, Cheung LW. An expanded model for mindful eating for health promotion and sustainability: issues and challenges for dietetics practice. *Journal of the Academy of Nutrition and Dietetics* 2016; 116(7): 1081-6.
9. Czepczor-Bernat K, Brytek-Matera A, Gramaglia C, Zeppegno P. The moderating effects of mindful eating on the relationship between emotional functioning and eating styles in overweight and obese women. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity* 2019; 1-9.
10. Sarto HM, Barcelo-Soler A, Herrera-Mercadal P, Pantilie B, Navarro-Gil M, Garcia-Campayo J, Montero-Marin J. Efficacy of a mindful-eating programme to reduce emotional eating in patients suffering from overweight or obesity in primary care settings: a cluster-randomised trial protocol. *BMJ open* 2019; 9(11).
11. Dunn C, Haubenreiser M, Johnson M, Nordby K, Aggarwal S, Myer S, Thomas C. Mindfulness approaches and weight loss, weight maintenance, and weight regain. *Current obesity reports* 2018; 7(1): 37-49.
12. Fuentes Artiles R, Staub K, Aldakak L, Eppenberger P, Rühli F, Bender N. (2019). Mindful eating and common diet programs lower body weight similarly: Systematic review and meta-analysis. *Obesity Reviews*, 20(11), 1619-1627.
13. Timmerman GM, Brown A. The effect of a mindful restaurant eating intervention on weight management in women. *Journal of nutrition education and behavior* 2012; 44(1):22-8.
14. Dalen J, Smith BW, Shelley BM, Sloan AL, Leahigh L, Begay D. Pilot study: Mindful Eating and Living (MEAL): weight, eating behavior, and psychological outcomes associated with a mindfulness-based intervention for people with obesity. *Complementary therapies in medicine* 2010; 18(6):260-4.
15. Werthmann J, Jansen A, Roef, A. Make up your mind about food: A healthy mindset attenuates attention for high-calorie food in restrained eaters. *Appetite* 2016; 105: 53-9.
16. Anderson LM, Reilly EE., Schaumberg K, Dmochowski S, Anderson DA. Contributions of mindful eating, intuitive eating, and restraint to BMI, disordered eating, and meal consumption in college students. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity* 2016; 21(1): 83-90.
17. Da Rosa Finger I, De Freitas BI, Da Silva Oliveira M. Psychological inflexibility in overweight and obese people from the perspective of acceptance and commitment therapy (ACT). *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity* 2020; 25(1): 169-75.
18. Hendrickson KL, Rasmussen EB. Effects of mindful eating training on delay and probability discounting for food and money in obese and healthy-weight individuals. *Behaviour research and therapy* 2013; 51(7): 399-409.
19. Mason AE, Epel ES, Kristeller J, Moran PJ, Dallman M, Lustig RH. Effects of a mindfulness-based intervention on mindful eating, sweets consumption, and fasting glucose levels in obese adults: data from the SHINE randomized controlled trial. *Journal of Behavioral Medicine* 2016; 39(2): 201-13.

20. Albay DM , Tutkun E , Ađaođlu Y, Canikli A, Albay F. Hentbol, voleybol ve futbol üniversite takımlarının bazı motorik ve antropometrik özelliklerinin incelenmesi. *Spor-metre Beden Eğitimi ve Spor Bilimleri Dergisi* 2008; 6(1): 20-13.
21. Acar H, Eler N. The Relationship between body composition and jumping performance of volleyball players. *Journal of Education and Training Studies* 2019; 7(3), 192-196.
22. Beshara M, Hutchinson AD, Wilson C. Does mindfulness matter? Everyday mindfulness, mindful eating and self-reported serving size of energy dense foods among a sample of South Australian adults. *Appetite* 2013; 67: 25-9.
23. Grinnell S, Greene G, Melanson K, Blissmer B, Lofgren IE. Anthropometric and behavioral measures related to mindfulness in college students. *Journal of American College Health* 2011; 59(6): 539-45.
24. Dibb-Smith A, Chapman J, Brindal E. Breaking habits with mindful snacking? An email-based intervention targeting unwanted snacking habits in an Australian sample. *Eating behaviors* 2019; 32: 37-43.
25. Fisher N, Lattimore P, Malinowski P. Attention with a mindful attitude attenuates subjective appetitive reactions and food intake following food-cue exposure. *Appetite* 2016; 99: 10-6.
26. Moor KR, Scott AJ, McIntosh WD. Mindful eating and its relationship to body mass index and physical activity among university students. *Mindfulness* 2013; 4: 264-74.
27. Acar H, Tutkun E. The effect of different term swimming exercise in rats on serum leptin levels: Effect of different term exercise on leptin. *Progr Nutr [Internet]* 2019; 22(1).
28. Choi SH, Lee H. Associations of mindful eating with dietary intake pattern, occupational stress, and mental well-being among clinical nurses. *Perspectives in Psychiatric Care* 2019; 1-8.
29. Taylor MB, Daiss S, Krietsch K. Associations among self-compassion, mindful eating, eating disorder symptomatology, and body mass index in college students. *Translational Issues in Psychological Science* 2015; 1(3): 229.
30. Webb JB, Rogers CB, Etzel L, Padro MP. “Mom, quit fat talking—I’m trying to eat (mindfully) here!”: Evaluating a sociocultural model of family fat talk, positive body image, and mindful eating in college women. *Appetite* 2018; 126: 169-75.
31. Abbaspoor Z, Javadifar N, Miryan M, Abedi P. Psychometric properties of the Iranian version of mindful eating questionnaire in women who seeking weight reduction. *Journal of Eating Disorders* 2018; 6(1): 1-8.
32. Chung S, Zhu S, Friedmann E, Kelleher C, Kozlovsky A, Macfarlane KW, Tkaczuk KHR, Ryan AS, Griffith KA. Weight loss with mindful eating in African American women following treatment for breast cancer: a longitudinal study. *Supp Care in Cancer* 2016; 24(4): 1875-81.
33. Clementi C, Casu G, Gremigni P. An abbreviated version of the Mindful Eating Questionnaire. *Journal of nutrition education and behavior* 2017; 49(4): 352-6.
34. World Health Organization (WHO). BMI classification. Access: ([http://apps.who.int/bmi/index.jsp?introPage=intro\\_3.html](http://apps.who.int/bmi/index.jsp?introPage=intro_3.html)). Access date: 23/08/2019.

---

Correspondence:

Gizem Köse

Department of Nutrition and Dietetics, Istanbul Kent University, Istanbul, Turkey

E-mail: drgizemkose@gmail.com