Acıbadem Univ. Sağlık Bilim. Derg. 2023; 14 (4): 631-639
https://doi.org/10.31067/acusaglik.1340369

ORIGINAL ARTICLE / ARAŞTIRMA YAZISI

Nutrition and Dietetics / Beslenme ve Diyetetik

Mindful Eating is More Effective to Beat Emotional Eating than Nutrition Education and Diet: A Randomized Controlled Study

İrem İnözü[1], Gizem Köse[2]

[1]Department of Nutrition and Dietetics, Health Sciences Institute, Acibadem Mehmet Ali Aydinlar University, Istanbul, Turkey

[2]Department of Nutrition and Dietetics, Faculty of Health Sciences, Acibadem Mehmet Ali Aydinlar University, Istanbul, Turkey

İrem İNÖZÜ

Gizem KÖSE

Correspondence: Gizem Köse
Department of Nutrition and Dietetics, Faculty of Health Sciences, Acibadem Mehmet Ali Aydinlar University, Istanbul, Turkey
Phone: +905335603738
E-mail: drgizemkose@gmail.com

Received: 10 August 2023
Accepted: 04 September 2023

ABSTRACT

Purpose: Mindful eating (ME) may have a potential improving problematic eating behaviors and lead to healthier food consumption. In this study, a randomized controlled trial that incorporated both mindful eating, including nutritional education with an energy-restricted diet. The aim is to contribute to the literature by revealing the comparative effectiveness of these approaches in alleviating problematic eating behaviors.

Methods: This prospective randomized controlled study was conducted between January-April 2021 with 70 participants without chronic disease. Interventions were conducted with an online platform in the groups as diet and education groups, also with control group. In the pre-test application first weekof the interventions, a questionnaire form including demographic data, Mindful Eating Questionnaire (MEQ-30), Turkish Emotional Appetite Questionnaire (EMAQ) were applied, and only anthropometric information and scales were used in the fifth week as post-test. Anthropometric information was collected based on declaration.

Results: Mean age of our participants was 33.40±12.27 years. Participant who had the ME education compared to the diet and control groups, had higher scores in physical activity ($p<0.01$), emotional appetite ($p<0.001$), MEQ-30 and its sub-factors ($p<0.01$). Disinhibition and Eating Discipline scores had correlations with EMAQ ($p<0.05$).

Conclusion: In summary, mindful eating can enhance the impact of individualized nutrition plans prepared by dietitians, as well as boost the effectiveness of nutritional guidance provided to clients in terms of managing weight and improving eating habits.

Keywords: eating behavior, mindfulness, body mass index, nutritional management.

Yeme Farkındalığı, Duygusal Yemeyi Yenmede Beslenme Eğitimi ve Diyetten Daha Etkindir: Randomize Kontrollü Bir Çalışma

ÖZET

Amaç: Yeme farkındalığı, problemli yeme davranışlarını iyileştirme ve besin tüketiminde sağlıklı seçimlere yönlendirmede faydalı olabilmektedir. Bu çalışma, katılımcılara beslenme eğitimiyle birlikte uygulanan enerji kısıtlı diyet ile yeme farkındalığı eğitiminin etkinliğini karşılaştırdığımız randomize kontrollü bir çalışmadır. Amaç, problemli yeme davranışlarını iyileştirmede bu yaklaşımların karşılaştırmalı etkinliğini ortaya çıkararak literature katkıda bulunmaktır.

Gereç ve Yöntem: Bu prospektif randomize kontrollü çalışma Ocak-Nisan 2021 tarihleri arasında kronik hastalığı olmayan 70 katılımcı ile yapılmıştır. Müdahaleler diyet ve eğitim grubu olarak gruplarda, ayrıca kontrol grubuyla birlikte yapılmış olup, çevrimiçi yöntemle eğitimler verilmiştir. Müdahalelerin ilk hafta ön test uygulamasında demografik verileri de içeren anket formu ile Yeme Farkındalığı Ölçeği (YFÖ-30), Türkçe Duygusal İştah Ölçeği (DİA) uygulanmış olup, beşinci hafta son testte yalnızca antropometrik bilgiler ve ölçekler kullanılmıştır. Antropometrik bilgiler katılımcıların beyanına dayalı olarak alınmıştır.

Bulgular: Katılımcıların yaş ortalaması 33.40±12.27 olarak bulunmuştur. Yeme farkındalığı eğitimi alan katılımcıların, diyet ve kontrol grubuna göre fiziksel aktivite ($p<0.01$), duygusal iştah ($p<0.001$), YFÖ-30 ve alt faktörlerinde ($p<0.01$) daha yüksek puan aldığı görülmüştür. Disinhibisyon ve Yeme Disiplini puanları ise DİA ile korelasyon göstermiştir ($p<0.05$).

Sonuç: Yeme farkındalığı uygulamaları, diyetisyenler tarafından hazırlanan bireyselleştirilmiş beslenme planlarının etkisini artırabileceği gibi, vücut ağırlığı yönetimi ve yeme alışkanlıklarının iyileştirmesi açısından danışanlara sağlanan beslenme rehberliğinin etkinliğini de artırabilir.

Anahtar Kelimeler: yeme davranışı, bilinçli farkındalık, beden kütle indeksi, beslenme yönetimi.

Mindfulness-based approaches are particularly effective in addressing binge eating, emotional eating, and leading to eat external cues. However, the evidence for using mindfulness for weight management is not strong with inconsistent results (1). Mindfulness Based Interventions (MBIs) for weight loss and overeating-related behaviors may have the potential to enhance lifestyle interventions, although their impact on short-term weight loss remains uncertain (2). The popular MBIs are mindful eating approach and MB-EAT (mindfulness-based eating awareness training). Mindful eating has proven effective in addressing various patterns associated with emotional eating and susceptibility to external cues. Moreover, MB-EAT contributes to positive outcomes like less problematic behaviors including overeating and restricted eating behaviors in weight loss, increased self-efficacy in relation to diet, and reduction in stress (3,4). Mindful eating interventions encompass practices like paying attention to physical hunger and fullness cues, and managing cravings and emotional triggers (5). This approach focuses on cultivating a healthier relationship with food rather than solely emphasizing food restriction (6).

Conventional weight loss methods that involve restricting energy intake and food choices often struggle to achieve sustainable results (5). Mindful eating, an emerging alternative approach to weight management, has gained attention. However, existing systematic reviews on mindful and intuitive eating have presented conflicting findings (7,8). Despite duration and application limitations, mindful eating can show promise as a practical method for individualized weight control (3). Mindful eating involves accepting the present moment without judgment while consuming food as understanding one's physical hunger and fullness cues, making informed decisions about what and how much to eat, prioritizing nutritious and enjoyable foods, avoiding distractions during meals, and acknowledging the consequences of mindless eating (9).

Mindfulness and mindful eating show promise in problematic eating behaviors and addressing the difficulties many encounters in managing food intake (7). Encouraging the adoption of a mindful eating approach could be a positive inclusion in general weight management guidance for the public interventions (1,4). Nutritional intervention and education combined program can serve larger populations with an ease in individualized applications as hunger and satiety awareness, craving, making healthier choices and behavior change (10). In the present study, mindful eating included nutritional education and energy restricted diet were applied randomized controlled trial to determine which one is more effective on problematic eating behaviors.

Materials and Methods

Participants

The prospective randomized controlled study was conducted on individuals aged 19-64 years with a Body Mass Index (BMI) of 25 kg/m^2 and above, between the dates of January and April 2021. Cohen's effect size for the study calculated as r=0.788. Using the effect size, the results of the Power Analysis are given as an appendix to the study. In the study, R v3.6.1 software was utilized for conducting the power analysis with an alpha error of 5% and a beta error of 20%. Taking into consideration the evaluation of the study across three groups and anticipating the presence of differences among variables after the process, it was calculated that a minimum of 15 samples per group would be sufficient (11). Based on the results of the power analysis, having a sample size of 15 in each group ensures an 80% reliability of the study. A total of 70 participants, including 30 in the control group, 20 in the energy restricted diet group, and 20 in the nutritional education group, were included in this study. The research obtained Ethical Committee Approval with a decision number as 2021/01-03, from the Medical Research Ethics Committee of the Acibadem Mehmet Ali Aydinlar University.

Data Collection

Individuals were examined in three groups as control group, diet group and education group. A questionnaire consisting of socio-demographic data form and scales of physical activity level, mindful eating, emotional eating and emotional appetite was applied to the groups before the intervention. Participants were invited through an online method, and the study conducted with those who accepted the invitation. Informed consent forms were obtained from participants and an online survey method was used.

Anthropometric information was collected based on declaration. Interventions were conducted in the groups other than the control group (diet and education groups). The energy-restricted diet group, which is abbreviated as the diet group, was given a specially prepared energy-restricted diet (500 kcal deficit from the daily requirement, 12), and the education group was given mindful eating included nutritional education three times a month as two hours included answers and questions. Additionally, physical activity recommendations for adults (at least 150-300

minutes of moderate physical activity) in compliance with World Health Organization (13) were provided to the intervened groups. The education sessions were conducted verbally through the Zoom application. After these interventions, including the control group, the same questionnaire was administered to all groups again, and the results were recorded. Following this process, the collected data was analyzed. The study determined mindful eating included nutritional education's impact on weight management and levels of physical activity, mindful eating, emotional appetite in individuals whose BMI were more than 24.9 kg/m^2.

Randomized Groups

Education Group: Participants included in the education group were provided with mindful eating included nutritional education, delivered through three modules in a month. Module ingredients were provided from MB-EAT program (4).

The education contents given are as follows:

MODULE 1	MODULE 2	MODULE 3
• Definition and Importance of Nutrition • Nutrients • Eat my Plate (14)	• Eating Behavior • Appetite and Eating	• Mindful Eating • Hunger-Fulness Scale • Questions & Answers

Figure 1. *Module contents given to the participants in the education group*

Diet Group: The daily energy requirements of participants in the energy-restricted diet group were calculated using the Harris-Benedict equation as part of the study. In diets prepared in accordance with the energy needs of individuals followed an energy-restricted diet (–500 kcal) and received in addition one of the educations of nutrition (module 1 of education group). During the implementation of the diets, online interviews were planned 2 times a month as two hours.

Socio-demographic Data Form

In this section of the administered questionnaire, participants were asked about their full name, gender, age, occupation, marital status, employment status, education level, living arrangements, body weight, height, and dietary intake record.

International Physical Activity Questionnaire (IPAQ)

International Physical Activity Questionnaire (IPAQ) is interpreted uniformly across all countries. IPAQ consists of 7 questions, including inquiries about time spent sitting, time spent in vigorous and moderate-intensity activities, and walking. Respondents are asked to provide answers. The calculation of the total score for the short form includes the frequency (days) and duration (minutes) of walking, vigorous, and moderate-intensity activities (15).

Mindful Eating Questionnaire (MEQ-30)

The relationship with eating, evaluated within the scope of mindful awareness, is assessed through the Mindful Eating Questionnaire (MEQ), developed by Framson, et al (16), with the purpose of measuring mindful eating. The Turkish validity and reliability study of the scale was published as the Mindful Eating Questionnaire (MEQ-30) (17). The scale, consisting of 30 questions, was administered using a 5-point Likert scale (1: never, 2: rarely, 3: sometimes, 4: often, 5: always). The scale comprises 7 sub-dimensions: Disinhibition (DI), Emotional Eating (EE), Eating Control (EC), MN: Mindfulness (MN), Eating Discipline (ED), Conscious Nutrition (CN), Interference (IN). The sub-dimensions of MEQ-30 and the contents within these dimensions are as follows: Emotional Eating (5 items): eating for satisfaction, feeling good and emotional hunger; Disinhibition (5 items): time and quantity control, restraint, mindless eating; Mindfulness (5 items): taking a break from other thoughts and activities while eating, focusing on the taste of the food itself; Eating Control (4 items): controlling the eating function, adjusting the eating speed; Eating discipline (4 items): plan, prepare, balance, keep, time, order; Conscious Nutrition (5 items): information of calorie and nutritional value, physical satiety-hunger awareness, habit awareness, healthy nutrition knowledge; Interference (2 items): sound, image, smell, etc. Ability to deal with distractors such as sensory factors, invitations, advertisements, or food variety. The responses given to the questions in the scale are evaluated and scored to reach a conclusion. Questions 1, 7, 9, 11, 13, 15, 18, 24, 25 and 27 are scored directly, while the remaining questions are reverse scored as 1=5, 2=4, 3=3, 4=2, 5=1. In the evaluation of the scale, arithmetic mean is taken for scoring. Accordingly, if the result is 3 or more, this result means that the individual's mindful eating level is high. The maximum score for the MEQ-30 is 150, and the minimum score is 30.

Turkish Emotional Appetite Questionnaire (EMAQ)

The Emotional Appetite Questionnaire (EMAQ), developed by Nolan, et al (18), was adapted into Turkish (19). The scale, consisting of 22 items and interpreted using a 9-point Likert-type scoring system, is originally named as Emotional Appetite Questionnaire. The EMAQ aims to assess an individual's emotional eating status. The statements in each item are rated on a scale of less influence (1-4), same influence (5), and more influence (6-9) on the individual's appetite. The presence of emotional eating is evaluated in negative/positive situations (8 items) and negative/positive emotions (14 items). By summing up the scores related to positive situations and positive emotions, the EMAQ Positive Total Score is determined. Similarly, by summing up the scores related to negative situations and negative emotions, the EMAQ Negative Total Score is determined. There is no specific cutoff point for emotional eating in the scale. The purpose of the scale is to demonstrate in which emotions and situations emotional appetite may particularly exist.

Statistical Analysis

Descriptive statistics including frequency and percentage were presented for categorical variables (demographic characteristics). The normality assumption of numerical variables was assessed using the Shapiro-Wilk Test. The descriptive statistics of numerical variables are given as mean standard deviation (Ẋ±SS) for normally distributed data, and median (min-max) values for non-normally distributed data. One-Way ANOVA Test was used for comparing independent multiple groups when the data followed a normal distribution, and the Kruskal-Wallis H Test was used for comparing independent multiple groups when the data did not follow a normal distribution. The outcomes of the multiple comparison tests were presented using a lettered notation alongside means and medians. To investigate the relationships between the scales, Spearman's Rank Difference Correlation Coefficient was utilized for determination. Interpreting the correlation coefficient: The following criteria were employed: if the correlation coefficient is < 0.2, it represents a very weak correlation; between 0.2 and 0.4, a weak correlation; within the range of 0.4 to 0.6, a moderate correlation; between 0.6 and 0.8, a high correlation; and if the correlation coefficient is > 0.8, a very high correlation (20).

In all calculations and interpretations, statistical significance levels of $p < 0.05$, $p < 0.01$, and $p < 0.001$ were considered, and hypotheses were formulated as two-tailed. The statistical analysis of the data was performed using the SPSS v26 software package (IBM Inc., Chicago, IL, USA).

RESULTS

According to the descriptive statistics, 55.7% of the participants were women. Participants' mean age was 33.40±12.27 years, more than half of them were single, mostly have a higher education level according to their educational status, mostly resided with family or relatives (Table 1). There was a statistically significant difference only in marital status between the education, diet and control groups in the study ($p<0.05$).

Table 2 presents the mean and standard deviation values of pre-test and post-test scores for participants according to their respective groups. In table 3 it was shown as differences in a detailed way.

Table 3 evaluates the statistical differences in the changes between pre-test and post-test scores of participants according to education, diet, and control groups. As presented in the table, significant differences were observed in the education group's changes compared to the diet and control groups, had higher scores in physical activity ($p<0.01$), emotional appetite ($p<0.001$), mindful eating scale, and its sub-factors ($p<0.01$).

When the correlations between the scales were examined, Disinhibition sub-factor of MEQ-30 score and the EMAQ Positive sub-factor scores had a significant positive moderate ($s=0.513$; $p<0.05$) and the EMAQ Negative sub-factor scores were significant positive moderate ($s=0.570$; $p<0.01$) correlation was found. Also, it was shown that there was a significant positive moderate correlation ($n=0.486$; $p<0.05$) between MEQ-30's Eating Discipline sub-factor and EMAQ Negative sub-factor scores. Again, a significant positive moderate correlation was resulted between MEQ-30 Total score and EMAQ Negative sub-factor scores ($s=0.472$; $p<0.05$) (Table 4). There were no correlations between IPAQ scores and other scales.

Table 1. Descriptive statistics of demographic variables of participants according to education, diet and control groups

	Education Group		Diet Group		Control Group		F-χ^2	p	Total	
	n	%	n	%	n	%			n	%
Sex										
Female	11	55.0	16	80.0	12	40.0	1.719	0.190	39	55.7
Male	9	45.0	4	20.0	18	60.0			31	44.3
Age (X̄±SS)	31.05±9.62		38.25±13.00		31.73±12.80		2.290	0.109	33.40±12.27	
Marital Status										
Married	7	35.0	13	65.0	9	30.0	**6.526**	**0.038***	29	41.4
Single	13	65.0	7	35.0	21	70.0			41	58.6
Employment Status										
Working	11	55.0	7	35.0	16	53.3	11.199	0.082	34	48.6
Not working	9	45.0	13	65.0	14	46.7			36	51.4
Occupation										
Housewife	0	0.0	1	5.0	2	6.7	0.003	0.954	3	4.3
Worker	5	25.0	1	5.0	4	13.3			10	14.3
Civil servant	1	5.0	3	15.0	1	3.3			5	7.1
Healthcare-worker	3	15.0	0	0.0	5	16.7			8	11.4
Teacher	1	5.0	2	10.0	1	3.3			4	5.7
Self-Employed	1	5.0	1	5.0	5	16.7			7	10.0
Retired	0	0.0	3	15.0	1	3.3			4	5.7
Not working	9	45.0	9	45.0	11	36.7			29	41.4
Educational Status										
Highschool or below	4	20.0	6	30.0	5	16.7	0.157	0.692	15	21.4
Bachelor's or above	16	80.0	14	70.0	25	83.3			55	78.6
Residence										
Family / Relative	11	55.0	17	85.0	21	70.0	0.024	0.877	49	70.0
Friend	6	30.0	0	0.0	2	6.7			8	11.4
Alone	3	15.0	3	15.0	7	23.3			13	18.6

F: One-Way ANOVA Test; χ^2: Chi-Square Test
**p<0.05*

Table 2. Pre-test and post-test according to education, diet and control groups

	Education Group	Diet Group	Control Group
Scales and BMI	**Ẋ±SS**	**Ẋ±SS**	**Ẋ±SS**
IPAQ -PRE	1294.20±532.42	671.78±570.37	922.35±594.07
IPAQ - POST	2812.75±1275.31	2431.05±3016.11	1474.75±1168.84
EMAQ Positive Total -PRE	69.10±17.47	44.65±12.92	45.80±15.74
EMAQ Positive Total - POST	49.40±7.11	38.00±10.45	41.57±15.75
EMAQ Negative Total - PRE	109.70±19.64	71.20±28.72	59.07±28.08
EMAQ Negative Total - POST	77.20±11.55	59.45±21.95	64.47±27.73
MEQ-30 Total - PRE	2.23±0.50	2.78±0.53	2.76±0.59
MEQ-30 Total - POST	3.24±0.27	3.20±0.47	2.79±0.59
Disinhibition - PRE	1.56±0.63	2.41±0.77	2.33±1.01
Disinhibition - POST	2.93±0.43	3.04±0.77	2.43±1.10
Emotional Eating - PRE	1.60±0.58	2.25±1.13	2.51±1.20
Emotional Eating - POST	2.99±0.50	3.07±1.08	2.61±1.24
Eating Control - PRE	2.15±0.85	2.94±1.08	2.78±1.14
Eating Control - POST	3.30±0.52	3.32±0.61	2.71±1.07
Mindfulness - PRE	2.82±0.47	3.12±0.49	3.12±0.42
Mindfulness - POST	3.35±0.22	3.04±0.38	3.08±0.33
Eating Discipline - PRE	2.81±0.85	2.99±0.88	2.93±0.62
Eating Discipline - POST	3.59±0.64	3.48±0.76	2.83±0.58
Conscious Nutrition - PRE	2.73±0.71	2.78±0.52	2.85±0.68
Conscious Nutrition - POST	3.41±0.40	3.11±0.64	3.02±0.61
Interference - PRE	1.95±0.69	2.95±1.05	2.77±1.06
Interference - POST	3.10±0.60	3.35±0.86	2.82±1.13
BMI- PRE (Ẋ±SS)	28.92±3.39	31.67±3.52	29.35±4.85
BMI - POST (Ẋ±SS)	28.24±2.98	30.63±4.22	29.43±4.92

IPAQ: International Physical Activity Questionnaire, EMAQ: Turkish Emotional Appetite Questionnaire, MEQ-30: Mindful Eating Questionnaire, BMI: Body Mass Index.

Table 3. Comparison of pre-test/post-test scale difference scores among participants in the education, diet, and control groups

	Education Group	Diet Group	Control Group		
Scales	**Ẋ±SS**	**Ẋ±SS**	**Ẋ±SS**	**F-*H***	**p**
IPAQ	1518.55±1234.35	1459.28±3151.07	552.40±1010.38	**10.147**	**0.006****
EMAQ Positive	19.70±16.08	6.65±11.31	4.23±8.46	**14.436**	**0.001****
EMAQ Negative	32.50±16.22	11.75±22.48	5.40±14.95	**33.643**	**<0.001*****
MEQ-30 Total	1.01±0.33	0.42±0.56	0.03±0.26	**38.526**	**<0.001*****
Disinhibition	1.37±0.50	0.63±0.99	0.10±0.56	**32.478**	**<0.001*****
Emotional Eating	1.39±0.40	0.82±1.23	0.10±0.68	**31.975**	**<0.001*****
Eating Control	1.15±0.56[b]	0.39±0.89[ab]	-0.07±0.50[a]	**21.100**	**<0.001*****
Mindfulness	0.53±0.49[b]	-0.08±0.43[a]	-0.04±0.40[a]	**12.964**	**<0.001*****
Eating Discipline	0.77±0.65	0.49±1.15	-0.10±0.46	**17.945**	**<0.001*****
Conscious Nutrition	0.68±0.61	0.33±0.72	0.17±0.38	**9.489**	**0.009****
Interference	1.15±0.73	0.40±0.95	0.05±0.44	**22.806**	**<0.001*****
BMI	-0.68±0,41	1.04±0.7	-0.1±0.1	1.580	0.213

*IPAQ: International Physical Activity Questionnaire, EMAQ: EMAQ: Turkish Emotional Appetite Questionnaire, MEQ-30: Mindful Eating Questionnaire, BMI: Body Mass Index, F: One-Way ANOVA Test; H: Kruskal-Wallis H Test **p<0.01; ***p<0.001*
a. b: The difference between medians that do not have a common letter is significant

Table 4. Correlation coefficients between IPAQ, EMAQ and MEQ-30 total and sub-factor scores

		DI	EE	EC	MN	ED	CN	IN	MEQ-30
IPAQ	**s**	-0.009	-0.055	0.105	0.373	-0.319	-0.253	-0.047	-0.045
	p	0.971	0.818	0.660	0.105	0.171	0.281	0.844	0.852
EMAQ-P	**s**	0.513	0.058	0.387	0.248	0.388	0.335	-0.214	0.327
	p	0.021*	0.808	0.092	0.292	0.091	0.149	0.364	0.159
EMAQ-N	**s**	0.570	0.133	0.340	0.323	0.486	0.329	-0.007	0.472
	p	0.009**	0.577	0.143	0.165	0.030*	0.157	0.978	0.036*

DI: Disinhibition, EE: Emotional Eating, EC: Eating Control, MN: Mindfulness, ED: Eating Discipline, CN: Conscious Nutrition, IN: Interference, MEQ-30: Mindful Eating Questionnaire Total, IPAQ: International Physical Activity Questionnaire, EMAQ-P: Positive Emotions; EMAQ-N: Negative Emotions;
s: Spearman's rank difference correlation coefficient
**p<0,05, **p<0.01*

Discussion

Nutritional interventions applied to the participants were discussed within the framework of demographic characteristics and scales of mindful eating, physical activity, emotional eating and emotional appetite results. In this interventional study, pre-test and post-test scores of the participants according to the education, diet and control groups, the education group had higher scores than diet and control groups in physical activity, emotional appetite (EMAQ), mindful eating (MEQ) and all sub-factors as disinhibition, emotional eating, eating control, conscious nutrition, eating discipline and interference. It was unexpected to see physical activity increase due to suggestions of 150 minutes per week. Moreover, education group had higher scale scores in emotional eating was revealing. In a similar study which examined the impact of combining mindful eating education with moderate energy restriction (diet) on weight loss in women with obesity, there was no significant difference in weight loss between them. But the mindful eating group exhibited a greater reduction in uncontrolled eating compared to the diet group, and a similar reduction in emotional eating was observed in both groups, surpassing the diet group (21). Consistent with the literature, mindful eating education and applications may have an effect on problematic eating behaviors mostly emotional eating.

In the present study, increasing eating discipline by internally through mindful eating, made participants not to deal with negative emotions by eating. A fourteen-week program combining mindful eating and nutrition education resulted in healthier eating patterns to reduce emotional eating and overeating (9). And similar to this present study in a one-month MB-EAT program with overweight or obese participants which generally focused on mindfulness practices resulted in weight loss and less problematic eating behaviors such as emotional eating, disinhibition, binge eating frequency (4). In addition, in an interventional MB-EAT study about diabetes self-management, researchers found that both groups showed positive changes in terms of enhanced self-efficacy in nutrition and eating, and better cognitive control over eating behaviors (22). In a randomized controlled study, Mindfulness-Based Interventions (MBIs) were found to be more effective than control conditions in increasing mindfulness scores and there were no differences in reducing body weight (3). Besides, meta-analysis indicated that MBIs were more effective than control groups in increasing mindfulness scores and reducing emotional eating related symptoms from pre-to post-treatment. Again, MBIs did not show a greater efficacy than control groups in reducing body mass, which could be influenced by the duration of interventions (2). Mindful eating application in the present study showed a decrease in emotional eating scores. Consistent with the literature we found that emotional appetite can be defeated by mindful eating.

Education groups gained internal cues resulted as disinhibition and positive and negative emotions correlated positively. Beshara, et al (23) revealed that individuals with higher levels of everyday mindfulness tended to be more mindful eaters, and they reported consuming smaller serving sizes of energy-dense foods. Furthermore, in a mindful eating study, intervention group had significant increases overall MEQ scores, disinhibition, and eating with awareness scores and as a result researchers suggested including healthcare professionals from various disciplines for further studies (24). Notably, aspects of mindful eating related to emotions and disinhibited eating were particularly influential in determining serving size.

In another study, mind-body practitioners had higher healthy eating index scores compared to non-practitioners. The study suggests that practicing mindfulness is linked to better diet quality, and this relationship is influenced by practitioners' internal cue abilities and self-determined approaches to regulating their eating behaviors (25).

In the present study, diet and education groups were examined separately and compared with the control group, positive results in eating behaviors were discussed. After the educational intervention, the probability of individuals to make sustainability can increase. In the literature a meta-analysis about mindful eating stated that considering intervention duration revealed that shorter interventions (e.g., six weeks) led to greater reductions in body mass compared to longer interventions (e.g., twenty-four weeks) (2). As a strength of this study, 70 participants were randomized by sex with an appropriate distribution, including 30 in the control group, 20 in the diet group, and 20 in the education group. The limitations of the study were the insufficient distribution of participants due to the limited four-week duration of the study, the inability of some individuals in the energy-restricted diet group to fully comply with the program prepared for them and also lack of mindfulness practices.

Conclusion

As a conclusion, it was found that including mindful eating applications to nutritional interventions had an impact on eating behaviors more than diet group. Individualized nutrition programs and educations prepared by dietitians can be more effective on weight management and eating behaviors.

Declarations

Funding

This study received no specific funding.

Conflicts of Interest

No potential conflict of interest was reported by the authors.

Ethics Approval

The protocol of the study was approved by the Ethical Committee of the Acibadem Mehmet Ali Aydinlar University with the number of 2021-01/03.

Availability of Data and Material

All authors accept that data and material is available on SPSS document.

Authors' Contribution

All authors contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

References

1. Warren JM, Smith N, Ashwell M. A structured literature review on the role of mindfulness, mindful eating and intuitive eating in changing eating behaviours: effectiveness and associated potential mechanisms. Nutr Res Rev. 2017;30:272-83. DOI: 10.1017/S0954422417000154
2. Mercado D, Robinson L, Gordon G, et al. The outcomes of mindfulness-based interventions for Obesity and Binge Eating Disorder: A meta-analysis of randomised controlled trials. Appetite. 2021;166:105464. DOI: 10.1016/j.appet.2021.105464
3. Salvo V, Curado DF, Sanudo A, et al. Comparative effectiveness of mindfulness and mindful eating programmes among low-income overweight women in primary health care: A randomised controlled pragmatic study with psychological, biochemical, and anthropometric outcomes. Appetite. 2022;177:106131. DOI: 10.1016/j.appet.2022.106131
4. Kristeller J, Wolever RQ, Sheets V. Mindfulness-based eating awareness training (MB-EAT) for binge eating: A randomized clinical trial. Mindfulness. 2014;5:282-97. DOI: 10.1007/s12671-012-0179-1
5. Carriere K, Khoury B, Gunak MM, et al. Mindfulness-based interventions for weight loss: A systematic review and meta-analysis. Obes Rev. 2018;19:164-177. DOI: 10.1111/obr.12623
6. Rogers JM, Ferrari M, Mosley K, et al. Mindfulness-based interventions for adults who are overweight or obese: A meta-analysis of physical and psychological health outcomes. Obes Rev. 2017;18:51–67. DOI: 10.1111/obr.12461
7. Fuentes Artiles R, Staub K, Aldakak L, et al. Mindful eating and common diet programs lower body weight similarly: Systematic review and meta-analysis. Obes Rev. 2019;20:1619-27. DOI: 10.1111/obr.12918
8. Tapper K. Can mindfulness influence weight management related eating behaviors? If so, how?. Clin Psychol Rev. 2017;53:122-34. DOI: 10.1016/j.cpr.2017.03.003
9. Lofgren IE. Mindful eating: an emerging approach for healthy weight management. AJLM. 2015;9:212-6. DOI: 10.1177/1559827615569684
10. Gidugu V, Jacobs ML. Empowering individuals with mental illness to develop healthy eating habits through mindful eating: results of a program evaluation. Psychol Health Med. 2019;24:177-86. DOI: 10.1080/13548506.2018.1516295
11. Cohen J. Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum; 1988.
12. Yancy WS Jr, Olsen MK, Guyton JR, Bakst RP, Westman EC. A low-carbohydrate, ketogenic diet versus a low-fat diet to treat obesity and hyperlipidemia: a randomized, controlled trial. Ann Intern Med. 2004;140:769-77. DOI:10.7326/0003-4819-140-10-200405180-00006
13. WHO (2020). WHO guidelines on physical activity and sedentary behaviour. [Website]. [cited 2021 Oct 9]. Available from: https://www.who.int/publications/i/item/9789240015128
14. Türkiye Beslenme Rehberi (TÜBER) (2022). [Website]. [cited 2021 Oct 9]. Available from: https://hsgm.saglik.gov.tr/tr/web-uygulamalarimiz/357.html

15. Lee PH, Macfarlane DJ, Lam TH, et al. Validity of the international physical activity questionnaire short form (IPAQ-SF): A systematic review. Int J Behav Nutr Phys Act. 2011;8:115. DOI: 10.1186/1479-5868-8-115

16. Framson C, Kristal AR, Schenk JM, et al. Development and validation of the mindful eating questionnaire. J Am Diet Assoc. 2009;109:1439-44. DOI:10.1016/j.jada.2009.05.006

17. Kose G, Tayfur M, Birincioglu I, et al. Adaptation Study of the Mindful Eating Questionnaire (MEQ) into Turkish. J Cogn Psychother. 2017;5:125-34. DOI:10.5455/jcbpr.250644

18. Nolan LJ, Halperin LB, Geliebter A. Emotional Appetite Questionnaire. Construct validity and relationship with BMI. Appetite. 2010;54:314–9. DOI: 10.1016/j.appet.2009.12.004

19. Demirel B, Yavuz FK, Karadere ME, Şafak Y, Türkçapar MH. The Emotional Appetite Questionnaire (EMAQ)'s Reliability and Validity and Relationship with Body Mass Index and Emotional Schemas. JCBPR. 2014;3:171-81

20. Choi J, Peters M, Mueller RO. Correlational analysis of ordinal data: from Pearson'sr to Bayesian polychoric correlation. Asia Pac Educ Rev. 2010;11:459-66. DOI: 10.1007/S12564-010-9096-Y

21. Pepe RB, Coelho GSMA, Miguel FDS, et al. Mindful eating for weight loss in women with obesity: a randomised controlled trial. Br J Nutr. 2023;130:911-20. DOI:10.1017/S0007114522003932

22. Miller CK, Kristeller JL, Headings A, et al. Comparison of a mindful eating intervention to a diabetes self-management intervention among adults with type 2 diabetes: a randomized controlled trial. Health Educ Behav. 2014;41:145-54. DOI: 10.1177/1090198113493092

23. 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. DOI: 10.1016/j.appet.2013.03.012

24. Knol LL, Lawrence JC, de la O R. Eat like a chef: a mindful eating intervention for health care providers. J Nutr Educ Behav. 2020;52:719-25. DOI: 10.1016/j.jneb.2020.02.024

25. Lévy-Ndejuru J, Lemieux S, Carbonneau É, et al. Associations between mind-body practice engagement and diet quality: Exploring the mediating roles of eating behaviour traits and regulation styles for eating behaviours in the PREDISE study. Appetite. 2023;184:106495. DOI: 10.1016/j.appet.2023.106495