Comparison of Intuitive Eating Behaviour, Eating Addiction and Nutritional Knowledge Level in Individuals Receiving Online and Face-to-Face Nutrition Counselling*

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Abstract

Aim: This study compares the level of nutritional knowledge, eating addiction, and intuitive eating behaviors in individuals receiving online and face-to-face nutrition counseling.

Method: This cross-sectional, descriptive research was conducted with 51 online and 51 face-to-face counselees who applied to the nutrition and counseling center in İstanbul for 12 weeks. The demographic characteristic information, Intuitive Eating Scale (IES-2), Yale Food Addiction Scale (YFAS), and Nutrition Knowledge Level Scale for Adults (NKLSA) were recorded, and anthropometric measurements were taken. Statistical analyses were performed with SPSS-27.

Results: 12 weeks of nutritional counseling resulted in a decrease in anthropometric measurements in both groups ($p<0.05$). Also, statistically significant improvement was observed in IES-2 and YFAS scores for both groups; however, no change was observed in NKLSA. There was no difference between the groups ($p>0.05$). A negative correlation was found between IES-2 and YFAS subscales in the face-to-face group (s:-0.162).

Conclusion: Both online and face-to-face nutrition counseling methods have similar effects on weight loss, increasing intuitive eating, and reducing eating addiction. Also, an intuitive eating approach can be recommended to control eating addiction. Future studies should focus on the effect of nutrition counseling on lasting behavior changes with longer-term interventions.

Keywords: Nutrition counseling, nutrition knowledge level, intuitive eating, food addiction.

Çevrimiçi ve Yüz Yüze Beslenme Danışmanlığı Alan Bireylerde Sezgisel Yeme Davranışı, Yeme Bağımlılığı ve Beslenme Bilgi Düzeyinin Karşılaştırılması

Öz

Amaç: Bu çalışma, çevrimiçi ve yüz yüze beslenme danışmanlığı alan bireylerin beslenme bilgi düzeylerini, yeme bağımlılıklarını ve sezgisel yeme davranışlarını karşılaştırmayı amaçlamaktadır.

Yöntem: Bu kesitsel, tanımlayıcı araştırma, İstanbul'daki beslenme ve danışmanlık merkezine başvuran 51 çevrimiçi ve 51 yüz yüze danışan ile 12 hafta boyunca yürütülmüştür. Demografik özellikler, Sezgisel Yeme Ölçeği (SYÖ), Yale Besin Bağımlılığı Ölçeği (YBBÖ), Yetişkinler için Beslenme Bilgi Düzeyi Ölçeği (YETBİD) yanıtları kaydedilmiş ve antropometrik ölçümleri alınmıştır. İstatistiksel analizler SPSS 27 ile yapılmıştır.

Bulgular: 12 haftalık beslenme danışmanlığı her iki grupta da antropometrik ölçümlerde azalma ile sonuçlanmıştır ($p<0,05$). Ayrıca, her iki grup için SYÖ ve YBBÖ skorlarında istatistiksel olarak anlamlı

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ETHICAL STATEMENT: Ethical permission, approved by the Ethics Committee of Istanbul Sabahattin Zaim University Rectorate dated 28.07.2023 and numbered 2023/07. This study was conducted in accordance with the helsinki declaration.

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iyileşme gözlenirken, YETBİD'de herhangi bir değişiklik gözlenmemiştir. Gruplar arasında fark bulunmamıştır (p>0,05). SYÖ ve YBBÖ alt ölçekleri arasında yüz yüze grupta negatif korelasyon bulunmuştur (s:-0,162).

Sonuç: Hem çevrimiçi hem de yüz yüze beslenme danışmanlığı yöntemlerinin ağırlık kaybının sağlanması, sezgisel yemenin artırılması ve yeme bağımlılığının azaltılması üzerinde benzer etkileri vardır. Ayrıca, yeme bağımlılığını kontrol etmek için sezgisel yeme yaklaşımı önerilebilir. Gelecekteki çalışmalar, daha uzun süreli müdahalelerle beslenme danışmanlığının kalıcı davranış değişiklikleri üzerindeki etkisine odaklanabilir.

Anahtar Sözcükler: Beslenme danışmanlığı, beslenme bilgi düzeyi, sezgisel yeme, yeme bağımlılığı.

Introduction

Intuitive eating (IE) is "the integration of mind, body, and food in a dynamic process" and relies on hunger and satiety cues to regulate food intake[1]. The non-diet approach requires full body acceptance regardless of size or shape and does not address health risks[2]. This approach aims to maintain health and appropriate weight by focusing on internal body signals. The primary approach is to regain "body wisdom"; the individual eats when hungry and stops when full. It is mainly used in health-oriented applications and obesity treatment; unlike calorie-restrictive diets, it is an innate mechanism and focuses on creating balance in the body instead of weight loss[3]. There is an opposite relationship between IE behavior and body mass index (BMI); people with lower BMI show better IE behavior[4]. Therefore, a new trend is emerging in treating obesity that puts health at the center rather than focusing on weight loss[5]. Additionally, Intuitive eating is negatively correlated with eating disorder symptoms, body dissatisfaction, and the idea of being thin. In contrast, it is associated with lower eating disorder risk, more positive body image, and positive emotional functioning[3].

Eating addiction (EA) is a disorder in which excessive food consumption leads to clinical weight gain and obesity. Psychological factors play an essential role in EA; it is suggested that high-calorie foods are used to cope with emotional stress[6]. A multidisciplinary approach and psychoeducation are necessary in the treatment of EA. Psychoeducation provides information about conscious food consumption and ways to cope with uncontrolled eating attack[7]. Nutrition and diet counseling provided by dietitians is also of critical importance. Nutrition information can be transferred to individuals through nutrition counseling. Today, nutrition counseling is provided through online or face-to-face interview methods, but studies on which method is more effective are limited. Lack of nutritional knowledge is essential for individuals' relationship with nutrients, and online nutrition counseling can be effective in increasing the level of nutritional knowledge[8]. It has been shown that online lifestyle interventions can help with weight loss and maintenance[9,10]. However, online diets have not been widely implemented, and it remains unclear whether they are effective[11]. Therefore, the present study aimed to compare IE, EA, and nutrition knowledge in individuals receiving online and face-to-face nutrition counseling.

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Material and Methods

Participants

This cross-sectional, descriptive, and prospective study was conducted with participants who applied to a nutrition and dietary counseling center in Istanbul between September 2023 and May 2024 and who volunteered to participate in the study. The sample size was calculated using the G*power program with an effect size of 0.5, power 0.8, confidence level α=0.05. Inclusion criteria for the study are being between the ages of 18 - 65, volunteering to participate in the study, being literate, not having received any professional nutrition/diet counseling in the past six months, and not having a previous diagnosis of eating disorder. Exclusion criteria include being under the age of 18, having a diagnosed eating disorder or any psychiatric illness, being pregnant or breastfeeding, and having a cognitive or physical disability that prevents participation in measurement or survey processes. A questionnaire form created by the researcher was used as a data collection tool. Demographic data and anthropometric data of the individuals were obtained through the questionnaire. "Intuitive Eating Scale-2 (IES-2)", "Yale Food Addiction Scale (YFAS)" and "Nutrition Knowledge Level Scale for Adults (NKLSA)" questionnaire forms were evaluated before and after 12 weeks of diet program.

Nutrition Counseling

Individual nutrition counseling was provided to the participants by a dietitian (who had a Bachelor's degree in the field of Nutrition and Dietetics) for 30 minutes for the first session and 15 minutes for the subsequent sessions. During the interviews, personalized nutrition plans were created in accordance with the Mediterranean-type nutrition model, taking into account the individual needs of the participants. To ensure standardization in the study, the participants in the online group were invited to the nutrition and dietary counseling center at the beginning of the study and end of the 12 weeks to respond to the questionnaire administered by the researcher and to have their anthropometric measurements taken in accordance with the same standard procedures. Nutrition counseling was provided weekly online for participants in the online group and weekly in person for participants in the face-to-face group.

Intuitive Eating Scale – 2: Intuitive Eating Scale-2 (IES-2) was developed by Tylka and Diest[12], and Turkish adaptation and validity and reliability study was conducted by Akırmak[5]. The Intuitive Eating Scale consists of 21 judgments in a 5-point Likert type, graded between 1-5. The increase in the scores obtained from the scale indicates that the level of IE is also increasing. IES-2 comprises four sub-scales, including Unconditional Permission to Eat, Eating for Physical rather than Emotional Reasons, Reliance on Hunger and Satiety Cues, and Body-Food Choice Congruence. The Cronbach's alpha value for this study was found to be 0.67.

Yale Food Addiction Scale: The Yale Food Addiction Scale (YFAS) is a tool used to assess food addiction developed by Gerhard et al.[13], and Turkish adaptation and validity and reliability study was conducted by Büyüktuncer et al.[14]. It is used as a mixed scale consisting of 27 items used to determine the addiction to certain foods and to explain the sub-criteria based on the diagnostic criteria of DSM-IV related to substance addiction. For seven symptoms, the total score obtained from the questions belonging to the

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criterion must be ≥1. The number of symptoms ranges from 0 to 7. YFAS comprises 8 sub-scales, including Consumption of food in excessive quantities and for a long time, Persistent desire or repeated unsuccessful attempt to quit, Much time/activity to obtain, use, recover, Important social, occupational, or recreational activities given up or reduced, Use continues despite knowledge of adverse consequences, Tolerance (Observed increase in quantity and decrease in impact), Characteristic withdrawal symptoms; somehow the person attempts to relieve withdrawal, The substance or behavior causes clinically significant impairment or distress. The Cronbach's alpha value for this study was found to be 0.57.

Nutrition Knowledge Level Scale for Adults: Nutrition Knowledge Level Scale for Adults was developed by Batmaz and Güneş. A basic nutrition score of less than 45 points is considered poor, 45-55 points is considered moderate, 56-65 points is considered good, and above 65 points is considered excellent nutritional knowledge[15]. The Cronbach's alpha value for this study was found to be 0.65.

Anthropometric Measurements: Weight, height, weight circumference (WC), hip circumference (HC), neck circumference (NC), waist-to-hip ratio, body fat, muscle, and body water percentage were evaluated. The participants' height was measured with a stadiometer, and WC, HC, and NC were measured by the researcher using a tape measure. NC was measured while the participant was standing, just below the larynx, parallel to the nape of the neck. WC was measured at the narrowest point between the lower ribs and the hip bone, and HC was measured at the widest point of the hip, with the tape measure parallel to the ground. All measurements were taken using a flexible yet taut measuring tape, directly on the skin, and by the same person. Body weight, body fat, lean mass, and body water ratios were determined with a bioelectrical impedance analysis device (BIA) using Tanita Tartı Perfecto. To ensure that BIA measurements are valid and reliable, participants were required to adhere to specific guidelines prior to the measurement. All participants were asked to refrain from eating for at least 4 hours before the measurement, avoid consuming any liquids other than water, avoid alcohol and caffeine for 12 hours prior to the measurement, and avoid strenuous physical activity. Prior to the measurement, participants were instructed to empty their bladders, remove any metal jewelry, and perform the measurement barefoot and wearing light clothing. Female participants were excluded from the measurement if possible during their menstrual period. All measurements were conducted by the same dietitian using the same device, in accordance with the device's measurement principles. Body Mass Index (BMI) was calculated with the Body weight (kg)/height(m^2)] formula[16].

Ethical Statement

The study was evaluated and approved by the Ethics Committee of Sabahattin Zaim University Rectorate at its meeting dated 28.07.2023 and numbered 2023/07. The informed consent form was obtained from all participants who voluntarily agreed to participate in the study. The study was conducted under the Principles of the Declaration of Helsinki.

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Statistical Analyses

The data obtained as a result of the research were evaluated by using the "The SPSS version 27 (IBM Inc., Chicago, IL, USA)" package program. Shapiro-Wilk Test, Independent Sample T-Test, Mann-Whitney U Test, and Spearman's Rank Difference Correlation Coefficient were used to compare the variables between the groups, and the statistical significance level was accepted as "$p<0.05$" for calculations and interpretations, and hypotheses were established as two-way.

Results

The demographic data of individuals, including 51 online and 51 face-to-face counselors, are shown in Table 1.

Table 1. Demographic findings of individuals according to nutrition counselling groups.

	Face-to-Face		**Online**		***p-value***
Gender	**n**	**%**	**n**	**%**	
Male	2	3.9	4	7.8	0.40[a]
Female	49	96.1	47	92.2	
Age (years) ($\underline{X} \pm SS$)	31.35±7.61		31.59±6.50		0.62[b]
Education Level					
Primary-Secondary Education	29	56.9	28	54.9	
Bachelor	20	39.2	21	41.2	0.97[a]
Postgraduate	2	3.9	2	3.9	
Employment Status					
Employed	24	47.1	26	51.0	0.69[a]
Unemployed	27	52.9	25	49.0	
Marital Status					
Married	37	72.5	37	72.5	1
Single	14	27.5	14	27.5	
Income Status					
Income less than expenses	6	11.8	6	11.8	
Income equal to expenses	37	72.5	29	56.9	0.16[a]
Income more than expenses	8	15.7	16	31.3	

[a] Pearson Chi-Square, [b] Mann Whitney U

The comparison of anthropometric measurement values before and after 12-week nutrition counseling program designed to support weight loss included in the study according to the study groups is given in Table 2. Pre-test and post-test results were compared in both groups and significant improvements were noted in all parameters ($p < 0.001$), particularly reductions in body weight, BMI, body fat percentage, and waist WC. Significant increases were also observed in muscle percentage and water percentage, while improvements in WC and HC were also noteworthy. There was no significant difference between the face-to-face and online groups ($p > 0.05$), indicating that similar results were obtained with both methods.

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Table 2. Summary findings and comparison of anthropometric measurement pre-test - post-test values of individuals according to study groups.

	Face-to-Face		**Online**		
	$\underline{X} \pm SS$	**Median (min-max)**	$\underline{X} \pm SS$	**Median (min-max)**	***p2 value***
Body Weight (Pre-Test)	82.23±19.52	78.5 (44-140.7)	8.45±15.46	80.8 (56.9-124)	0.390
Body Weight (Post-Test)	73.77±17.52	70.8 (31.4-123.9)	75.22±13.20	73.5 (50.2-110.2)	0.399
W	**W=-5.896**		**W=-5.746**		
p1 value	**<0.05[a]**		**<0.05[a]**		
BMI (Pre –Test)	31.09±6.95	30.7 (15.2-49,1)	31.04±5.41	31 (21.9-49.72)	0.941
BMI (Post –Test)	27.91±6,43	27.4 (11.5-45.8)	27.93±4.26	27.5 (21-40.9)	0.710
T-W	**T=10.595**		**W=-5.783**		
p1 value	**<0.05[b]**		**<0.05[a]**		
Body Fat Percentage (Pre-Test)	39.64±6.90	39.2 (21-55)	38.25±5,97	38.6 (23.5-52,5)	0.281
Body Fat Percentage (Post-Test)	35.84±8.06	35.1 (21.1-64.6)	33.43±6.79	33.3 (15.2-48)	0.261
T-W	**W=-5.521**		**T=13.895**		
p1 value	**<0.05[a]**		**<0.05[b]**		
Body Muscle Percentage (PreTest)	57.24±6.49	57.7 (42.7-74.9)	58.63±5.67	58.3 (45.2-72.7)	0.253
Body Muscle Percentage (Post Test)	60.61±7.05	61.6 (44.6-74.9)	62.79±6.01	63.3 (49.4-80.6)	0.097
T	**T=-5.979**		**T=-12.780**		
p1 value	**<0.05[b]**		**<0.05[b]**		
Body Water Percentage (Pre-Test)	45.76±4.45	45.8 (35-60.1)	47.09±8.24	45.8 (36.7-98.4)	0.786
Body Water Percentage (Post-Test)	48.60±6.95	48.2 (37-88)	48.48±4.52	48.5 (40.8-65.9)	0.786
W	**W=-5.362**		**W=-5.426**		
p1 value	**<0.05[a]**		**<0.05[a]**		
Waist Circumerence (Pre-Test)	98.92±17.60	98 (67-145)	97.67±14.61	96 (72-147)	0.763
Waist Circumerence (Post-Test)	90.28±16.18	87 (67-138)	88.57±12.66	87 (68-129)	0,896
W	**W=-6.206**		**W=-6.218**		
p1 value	**<0.05[a]**		**<0.05[a]**		
Hip Circumerence (Pre-Test)	112.74±14.57	111 (87-155)	112.52±11.34	112 (88-156)	0.733
Hip Circumerence (Post-Test)	105.11±12.81	105 (84-146)	105.45±10.94	105 (84-143)	0.547
W	**W=-5.608**		**W=-6.130**		
p1 value	**<0.05[a]**		**<0.05[a]**		
Neck Circumerence (Pre-Test)	33.44±3.18	33 (29-46)	34.36±3.27	34 (29-45)	0.072
Neck Circumerence (Post-Test)	33.02±2.85	32 (29-44)	33.74±2.71	34 (29-43)	0.072
W	**W=-3.243**		**W=-4.294**		
p1 value	**0.05[a]**		**<0.05[a]**		

[a] Wilcoxon Signed-Rank Test , [b] Dependent Sample T-Test,T: Test statistic obtained from a paired sample t-test; indicates the significance of the mean difference between two measurements , W: Test statistic obtained from Wilcoxon Signed-Rank Test indicates the significance of the difference between two measurements. p1 values indicate within-group changes before and after the nutritional counseling; p2 values represent between-group differences at the end of the 12 weeks.

Comparison of sub-factor and total scores of IES-2, YFAS, and NKLSA according to the study groups of individuals before and after 12 weeks of nutrition counseling presented in Table 3. Significant improvements were observed in pre-test and post-test comparisons in IES-2 and YFAS total scores and subgroups in both groups. In the NKLS

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score, the face-to-face nutrition counseling group had statistically significantly higher scores than the online group. Also, it was found that the 12-week nutrition counseling had no significant effect on the NKLS score in both groups.

Table 3. Comparison of pre-test - post-test sub-factor and total scores of IES-2, YFAS, NKLSA according to the study groups of individuals.

	Face to Face		**Online**			
	$\underline{X} \pm SS$	**Median (min-max)**	$\underline{X} \pm SS$	**Median (min-max)**	**t-U**	***p2 value***
UPE – Pre-Test	3.10±0.75	3 (1.2-4.4)	3.00±0.76	3 (1-4.6)	t=0.681	0.498
UPE – Post-Test	3.36±0.56	3.4 (2-4.4)	3.11±0.42	3.2 (2.2-4)	U=936.5	0.014*
T-W	**T=-2.336**		**W=-0.988**			
p1 value	**0.024*[a]**		**0.323[b]**			
EPR – Pre-Test	3.07±0.88	3 (1-5)	2.71±0.93	2.5 (1-4.5)	t=2.018	0.046*
EPR – Post-Test	3.42±0.53	3.4 (2.3-5)	3.75±0.46	3.9 (2.1-4.8)	U=767	<0.001***
T-W	**T=-3.199**		**W=-5.231**			
p1 value	**0.05[a]**		**<0.05[b]**			
RHSC – Pre-Test	3.03±0.96	3 (1-5)	2.88±0.90	3 (1-5)	t=0.815	0.417
RHSC – Post-Test	3.76±0.62	3.8 (2-5)	3.74±0,85	3.5 (2.7-8.7)	U=1121.5	0.228
W	**W=-4.746**		**W=-4.544**			
p1 value	**<0.05[b]**		**<0.05[b]**			
B-FCC – Pre-Test	3.07±1.11	3 (1-5)	2.72±0.87	3 (1-5)	U=1061.5	0.102
B-FCC – Post-Test	3.78±0.69	4 (2-5)	3.47±0.90	4 (1-5)	U=1054.5	0.078
W	**W=-3.369**		**W=-3.858**			
p1 value	**<0.05[b]**		**<0.05[b]**			
IES-2 Total – Pre-Test	3.06±0.51	3.1 (1.7-4.2)	2.83±0.49	2.8 (1.8-3.8)	**t=2.387**	**0.019***
IES 2- Total – Post-Test	3.54±0.37	3.7 (2.7-4.3)	3.57±0.27	3.6 (3-4.5)	U=1287	0.928
T-W	**T=-6.478**		**W=-5.768**			
p1 value	**<0.05[a]**		**<0.05[b]**			
Consumption of food in excessive quantities and for a long time						
Pre-Test	0.57±0.85	0 (0-3)	0.55±0.88	0 (0-3)	1274.5	0.839
Post-Test	0.04±0.20	0 (0-1)	0.02±0.14	0 (0-1)	1275	0.560
W	**-3.835**		**-3.835**			
p1 value	**<0.05[b]**		**<0.05[b]**			
Persistent desire or repeated unsuccessful attempt to quit						
Pre-Test	1.24±0.71	1 (0-3)	1.41±0.90	1 (0-5)	1197	0.448
Post-Test	0.96±0.45	1 (0-2)	1.18±0.59	1 (0-3)	1071.5	0.045*
W	**-2.198**		**-1.794**			
p1 value	**0.028*[b]**		**0.073[b]**			
Much time/activity to obtain, use, recover						
Pre- Test	0.57±0.94	0 (0-3)	0.61±0.96	0 (0-3)	1248.5	0.680
Post- Test	0.04±0.20	0 (0-1)	0.04±0.20	0 (0-1)	1300.5	1.000
W	**-3.469**		**-3.945**			
p1 value	**<0.05[b]**		**<0.05[b]**			
Important social, occupational, or recreational activities given up or reduced						
Pre-Test	0.71±1.15	0 (0-4)	0.33±0.68	0 (0-2)	1132	0.145
Post-Test	0.12±0.52	0 (0-3)	-	-	1224	0.080

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W	**-3.624**		**-3,017**			
p1 value	**<0.05[b]**		**<0.05[b]**			
Use continues despite knowledge of adverse consequences						
Pre-Test	0.29±0.46	0 (0-1)	0.24±0.43	0 (0-1)	1224	0.503
Post-Test	0.55±0.50	1 (0-1)	0.69±0.47	1 (0-1)	1122	0.156
W	**-3.606**		**-3.888**			
p1 value	**<0.05[b]**		**<0.05[b]**			
Tolerance (Observed increase in quantity and decrease in impact)						
Pre-Test	0.71±0.7	1 (0-2)	0.43±0.70	0 (0-2)	**985.5**	**0.018***
Post-Test	0.80±0.66	1 (0-2)	0.57±0.57	1 (0-2)	1061.5	0.074
W	-0.892		-0.755			
p1 value	0.373[b]		0.450[b]			
Characteristic withdrawal symptoms; somehow the person attempts to relieve withdrawal						
Pre-Test	0.51±0.83	0 (0-3)	0.47±0.90	0 (0-3)	1218.5	0.502
Post- Test	0.02±0.14	0 (0-1)	-	-	1275	0.317
W	**-3.898**		**-3.376**			
p1 value	**<0.05[b]**		**<0.05[b]**			
The substance or behavior causes clinically significant impairment or distress						
Pre- Test	0.27±0.60	0 (0-2)	0.18±0.43	0 (0-2)	1238.5	0.531
Post-Test	-	-	0.04±0.28	0 (0-2)	1275	0.317
W	**-2.889**		**-2.111**			
p1 value	**<0.05[b]**		**0.03[b]**			
YFAS Total						
Pre- Test	4.86±3.50	4 (1-16)	4.22±3.20	3 (0-12)	1142	0.285
Post- Test	2.53±1.30	3 (0-6)	2.53±1.22	3 (0-5)	1299	0.992
W	**-4.344**		**-2.995**			
p1 value	**<0.05[b]**		**0.05[b]**			
NKLSA – Pre Test	51.14±8.30	51 (27-82)	47.59±8.75	48 (26-76)	U=935.5	0.014*
NKLSA – Post- Test	49.22±5.60	50 (36-72)	47.04±5.98	49 (31-55)	U=1098	0.174
W	**W=-1.832**		**W=-0.055**			
p1 value	**0.067[b]**		**0.956[b]**			

[a] Dependent Sample T-Test ,[b] Wilcoxon Signed-Rank Test, T: Test statistic obtained from a paired sample t-test; indicates the significance of the mean difference between two measurements. W: Test statistic obtained from Wilcoxon Signed-Rank Test indicates the significance of the difference between two measurements. UPE: Unconditional Permission to Eat, EPR: Eating for Physical Rather Than Emotional Reasons, RHSC: Reliance on Hunger and Satiety Cues, B-FCC: Body–Food Choice Congruence. p1 values indicate within-group changes before and after the nutritional counseling; p2 values represent between-group differences at the end of the 12 weeks.

Correlation coefficients between IES-2 and YFAS sub-factor and total difference scores according to study groups of individuals are given in Table 4. Significant correlations were found between YFAS sub-groups and IES-2 scores in the face-to-face group. Also, a correlation was found between tolerance and IES-2 score in the online group.

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Tablo 4. Correlation Coefficients Between YFAS Sub-Factor and Total Difference Scores and IES-2 Sub-Factor and Total Difference Scores According to Study Groups of Individuals.

		Face-to-Face					Online				
		UPE	**EPR**	**RHSC**	**B-FCC**	**IES-2 Total**	**UPE**	**EPR**	**RHSC**	**B-FCC**	**IES-2 Total**
Consumption of food in excessive quantities and for a long time	s	0.261	-0.423	-0.151	-0.211	-0.307	0.100	-0.130	-0.187	-0.182	-0.187
	p value	0.064	0.002*	0.291	0.137	0.029*	0.483	0.363	0.189	0.200	0.189
Persistent desire or repeated unsuccessful attempt to quit	s	-0.039	0.091	0.108	0.000	0.076	0.398	0.008	0.058	-0.095	0.152
	p value	0.788	0.525	0.452	0.999	0.595	0.004**	0.957	0.689	0.506	0.288
Much time/activity to obtain, use, recover	s	-0.091	-0.217	-0.221	-0.128	-0.316	0.387	-0.293	-0.147	0.040	-0.146
	p value	0.527	0.127	0.120	0.371	0.024*	0.005**	0.037*	0.302	0.781	0.306
Important social, occupational, or recreational activities given up or reduced	s	-0.088	-0.185	-0.330	-0.110	-0.384	-0.017	0.030	0.061	-0.126	0.018
	p-value	0.538	0.193	0.018*	0.442	0.005**	0.908	0.836	0.671	0.378	0.901
Use continues despite knowledge of adverse consequences	s	0.064	0.360	0.150	0.111	0.379	0.329	0.245	0.053	0.023	0.236
	p value	0.653	0.009**	0.293	0.436	0.006**	0.019*	0.083	0.714	0.870	0.095
Tolerance (Observed increase in quantity and decrease in impact)	s	-0.260	0.418	0.269	0.203	0.369	0.340	0.424	0.053	0.041	0.441
	p value	0.065	0.002**	0.056	0.152	0.008**	0.015*	0.002**	0.710	0.774	0.001**
Characteristic withdrawal symptoms; somehow the person attempts to relieve withdrawal	s	0.027	-0.288	-0.237	-0.099	-0.328	0.272	-0.023	0.045	-0.118	0.111
	p value	0.853	0.040*	0.094	0.491	0.019*	0.054	0.871	0.756	0.411	0.437
The substance or behavior causes clinically significant impairment or distress	s	0.028	-0.406	-0.301	-0.080	-0.437	0.344	-0.067	-0.259	0.021	-0.035
	p value	0.847	0.003**	0.032*	0.575	0.001**	0.014*	0.639	0.067	0.886	0.805
YFAS Total	s	-0.085	-0.033	-0.176	-0.042	-0.162	0.562	0.081	0.001	-0.081	0.219
	p value	0.553	0.818	0.215	0.772	0.257	<0.001***	0.573	0.997	0.574	0.122

s: Spearman Rank Difference Correlation Coefficient, IES-2: Intuitive Eating Scale–2, EPR: Eating for Physical Rather Than Emotional Reasons, UPE: Unconditional Permission to Eat, RHSC: Reliance on Hunger and Satiety Cues, B-FCC: Body–Food Choice Congruence.

Discussion

Today, face-to-face and online nutrition counseling methods are widely used in nutrition and diet counseling. Comparing the effects of online and face-to-face nutrition counseling is important in terms of selecting the most appropriate and effective method for counselees. Since both methods have different advantages, determining the most

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appropriate option according to the needs of individuals can increase the success of counseling processes.

In general, the majority of the participants were women and exhibited similar socioeconomic status, indicating that a certain equality was achieved between both methods of nutrition counseling. The results obtained from anthropometric measurements revealed that online and face-to-face nutrition counseling resulted in statistically significant reductions in weight, BMI, body fat, WC, HC, waist/hip ratio, and NC. Twelve weeks of nutrition counseling was effective in weight loss. However, there was no difference between the two methods. Al-Awadhi et al. also compared face-to-face and online personalized nutrition with a systematic review and reported significantly greater outcomes in the face-to-face groups[17]. On the contrary, Yang et al. stated in their systematic review and meta-analysis study that face-to-face and online nutrition counseling achieve preliminary success in promoting weight-related outcomes. In today's modern world, digitalization is increasing and becoming more widespread. Recent studies report that the results of online nutrition counseling including elements such as text messages (SMS), mobile applications, email, telephone counseling, websites, or social media are as effective as face-to-face interventions[18].

Intuitive eating, EA, and nutritional knowledge are factors affecting the success of nutritional counseling. Results obtained from this study revealed that both face-to-face and online nutrition counseling improved IE behavior. Cheng et al. compared face-to-face and online IE interventions among women and reported that both methods improved body image and eating behaviors, but there were no differences between the methods[19]. Additionally, the results of the present study also showed that both face-to-face and online nutrition counseling positively improved YFAS subscores and total scores. Similarly, Yu et al. also revealed that both face-to-face and online nutrition counseling techniques for 12 weeks were equally effective on EA[20]. In addition to all these findings, the results of this study showed that 12 weeks of online and face-to-face nutrition counseling had no effects on nutrition knowledge. Nutrition counseling is generally designed to increase individuals' nutritional knowledge, promote healthy eating habits, and change negative habits[21]. However, in today's modern world, social media can lead to information pollution that is difficult to notice, as well as developing positive and conscious eating behaviors and attitudes[22].

Intuitive eating supports controlling hunger and satiety signals and can reduce the risk of EA. As given in Table 4, IE generally showed a negative correlation with EA. The cross-sectional survey studies indicate that IE positively correlates with improved dietary intake[23]. Consistent with the literature, IE was associated with lower EA scores in our study.

This study also has some limitations. Even if the study period is three months, it may not adequately reflect long-term behavioral changes. Uncontrollable factors such as stress and social environment during the study may affect the results. The heterogeneity of the participant groups in terms of gender may also limit the generalisability of the results.

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Conclusion

Twelve weeks of nutrition counseling improved anthropometric measurements; both methods were effective in weight loss. However, there were no differences between the methods. Nutrition counseling was found to statistically significantly improve IE behavior and food addiction for both face-to-face and online counseling. The level of nutritional knowledge was found to be poor in both groups, and no statistically significant change was observed at the end of the 12 weeks. The lack of effectiveness in increasing the knowledge level of nutrition counseling may be related to the short duration of the interview, insufficient individualization of the training, limited interaction of the method used, and insufficient strategies for reinforcing the knowledge. Therefore, it is important not only to extend the duration of the interview but also to structure the training content in accordance with the knowledge and learning level of the participants, to use repetition and practice-based methods, to support with digital materials, and to plan post-training follow-up processes. In addition, supporting the communication, motivation, and training skills of the dietitian providing counseling services may increase the impact of the training. An extended study period may be necessary to enhance knowledge levels effectively. In addition, a negative correlation was found between IE and food addiction. In conclusion, the results of this study suggest that the results of online nutrition counseling may be similar to those of face-to-face counseling. More studies are needed to contribute to the literature.

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