Original Article

HEALTH SCIENCES
MEDICINE

DOI: 10.32322/jhsm.1660252

J Health Sci Med. 2025;8(3):514-523

Evaluation of the relationship between health literacy and mindful eating in obesity patients*

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Cite this article as: Koçyiğit Y, Bıçakcı Ay Ş, Demirel GK, Eriş Davut Ö. Evaluation of the relationship between health literacy and mindful eating in obesity patients. *J Health Sci Med.* 2025;8(3):514-523.

Received: 18.03.2025 ◆ **Accepted**: 27.05.2025 ◆ **Published**: 30.05.2025

ABSTRACT

Aims: Obesity is a multifactorial chronic disease and is a significant cause of morbidity and mortality when left untreated. Preventive health services play a substantial role in the fight against diseases that can cause a global crisis such as obesity. The primary goal of preventive health services in obesity is to ensure that people acquire healthy eating habits. It has been shown that factors such as maladaptive social attitudes, emotional eating have a significant effect on mindful eating. Health literacy and mindful eating are essential concepts in developing healthy eating habits. In this study, we aim to measure the health literacy levels of obese individuals, evaluate their mindful eating, and reveal whether there is any relationship between them.

Methods: The study consists of obese patients who were eligible and applied to Ankara Etlik City Hospital Obesity Center between August-December 2024. The individuals who gave their consent were given a form that evaluated their socio-demographic information, the Turkish Health Literacy Survey-32 (THLS-32) and the Mindful Eating Questionnaire (MEQ) and mental status examinations were conducted through face-to-face interviews by two psychiatrists in accordance with DSM-5 diagnostic criteria. Individuals under the age of 18 and those with conditions that could impair judgment were excluded from the study. With regard to eating disorders, participants were likewise evaluated by the interviewers based on DSM-5 diagnostic criteria.

Results: A total of 232 obese individuals were included in the study (191 female, 41 male). When the health literacy scores were examined, 3.0% (n=7) were inadequate (0-25), 23.7% (n=55) were problematic-limited (26-33), 47.8% (n=111) were sufficient (34-42), 24.6% (n=57) were excellent (43-50), and the general mindful eating scores were 2.90±0.541. When the relationship between health literacy and mindful eating is examined, it is seen that there is a positive (r=0.157) significant relationship at general score (r=0.146), treatment and service score (r=0.137), disease prevention and health promotion - access to health related-information (r=0.167), disease prevention and health promotion - understanding health related information (r=0.141), access to health-related information (r=0.154) and understanding health related-information (r=0.157).

Conclusion: Obesity treatment requires a multidimensional approach. For this process to be practical, many factors, such as healthy diet, physical activity, psychological support, and increasing health literacy, should be considered together. Healthy diet is an integral part of this multidimensional approach. Determining the psychological and individual factors associated with obesity, determining these factors, and increasing health literacy with dietary education and awareness-based practices can contribute to a more efficient, permanent, and sustainable weight loss process for obese patients.

Keywords: Obesity, health literacy, mindfulness, disordered eating behavior

*This study has been accepted to be presented in the poster session at the 3rd International 27th National Clinical Education Symposium to be held on 27-30 April 2025.

INTRODUCTION

Obesity is a chronic disease characterized by an increase in body fat mass, arising from the complex interaction of metabolic, genetic, socio-cultural, and behavioral factors. If left untreated, it can lead to significant morbidity and mortality. According to the World Health Organization (WHO) and the global burden of disease (GBD) studies, obesity constitutes a major risk factor for life-threatening conditions such as ischemic heart disease, type 2 diabetes, and cerebrovascular diseases. The disease burden attributable to high body-mass index (BMI) has increased approximately 2.5-fold between 1990 and 2021, ranking among the leading causes of disability-adjusted life years (DALYs) globally.[1]

The treatment of obesity requires a targeted multidimensional approach. Weight loss programs should be carefully planned according to individual characteristics and maladaptive thoughts and attıtudes.[2] In addition to many metabolic and endocrine causes in obesity, impaired eating behavior, loss of emotional management, emotional eating, difficulties in healthy diet and physical activity are important obstacles to weight loss and therefore obesity. The importance of targeted

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health programs and special interventions focusing on the relevant obstacles for a healthy lifestyle and habits in obesity treatment is better understood over time.[3]

Diseases whose prevalence is increasing day by day in our country and in the world and can cause a global crisis also require more importance to be given to preventive health services. Preventive health services aim to help individuals gain healthy living habits. Health literacy plays a major role in acquiring healthy lifestyle habits.[4]

First defined by Simonds in 1974, 'health literacy' is defined by the World Health Organization as the use and understanding of health-improving information and cognitive, motivational and social skills that affect individuals' access to health services.[5]

Health literacy also includes the ability to correctly understand and interpret the health system, the ability to communicate correctly with health professionals, and the ability to use health information received correctly and effectively. It increases individuals' participation in preventive health services by ensuring that they adopt health-improving behaviors.[6,7]

Studies show that individuals with high or sufficient health literacy are more careful about healthy nutrition, prefer foods with less sugar, and adopt health-improving behaviors such as healthy eating habits, awareness of emotional eating, learning emotional triggers and how to deal with them. Increasing awareness and differentiation between physical and emotional hunger and regular physical activity; while those with low levels have less information about health problems caused by obesity and make less effort to maintain ideal weight.[8]

The sustainability of healthy eating habits is not solely dependent on health literacy. Individual awareness-based constructs, such as mindful eating and self-efficacy, also play a critical role in this process. While health literacy facilitates access to and understanding of health-related information, mindful eating behavior enhances the likelihood of translating this knowledge into actionable behavior. In this sense, these two concepts are complementary in nature. According to Bandura's self-efficacy theory, individuals who believe in their ability to control eating behavior despite emotional or environmental triggers are more likely to engage in mindful eating practices.[9] Therefore, when considered together, health literacy, self-efficacy, and mindfulness play a pivotal role in the adoption and maintenance of healthy lifestyle behaviors.[10]

Mindfulness is the process of focusing one's attention on the present moment. Mindful eating also includes awareness of internal and external cues that affect food desire, food choices, the amount eaten, and the way food is eaten, as well as learning to make conscious choices and be more aware of cues indicating satiety. Paying attention to these factors has been shown to lead to healthier eating.[11]

Obesity is not a phenomenon in itself; it is a complex condition where individual characteristics, along with endocrine and genetic factors, have important effects. When evaluating individual characteristics, it is necessary to keep in mind how the person perceives the disease, how much they adopt health-enhancing behaviors, as well as the level of consciousness with which they seek treatment, and important factors such as mindful eating, which are thought to be important determinants of healthy eating. Multidimensional treatment approaches and personalized treatment plans will have a chance to be more effective with the understanding of these factors.[3,11]

Accordingly, this study aims to evaluate awareness-based individual factors, specifically health literacy and mindful eating, in an integrated manner. In the existing literature, these two constructs are often addressed independently, and their interrelationship has not been sufficiently explored.[12] From this perspective, the study seeks to make an original contribution to the field.

The first hypothesis of this study posits that higher levels of health literacy in individuals with obesity will be positively associated with increased mindful eating behavior. The second hypothesis suggests that higher levels of both health literacy and mindful eating will be negatively associated with dysfunctional eating behaviors, specifically emotional eating and disinhibition. We believe that health literacy and mindful eating may be important in terms of obesity awareness, treatment and healthy diet. Our aim in this study is to measure the health literacy levels of obese individuals, to evaluate their mindful eating and to reveal whether there is any relationship between them.

METHODS

Before the study, approval was obtained from the Ankara Etlik City Hospital Scientific Researches Evaluation and Ethics Committee (Date: 14.08.2024, Decision No: AEŞH-BADEK-2024-659). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

This study is a descriptive and cross-sectional study conducted with individuals over the age of 18, with a BMI ≥30 kg/m^2, who applied to the Ankara Etlik City Hospital Obesity Center between August 2024 and December 2024, were informed about this study, agreed to participate, and gave informed consent. Those with a neurological/mental disorder such as epilepsy, dementia, delirium, those diagnosed with a severe mental illness during an exacerbation period, and those with a cognitive or physical disability that would prevent them from participating in the study were excluded from the study.

Data Collection Tools

The individuals who gave their consent to participate in the study underwent mental status examinations and were given a form that assessed their sociodemographic information (such as age, education level, occupational status), and the Turkiye Health Literacy Survey-32 (THLS-32) and MEQ were applied.

Sociodemographic Data Collection Form: This is a form that includes patients' sociodemographic data such as age, education, and employment status, as well as information about the disease.

Turkiye Health Literacy Survey-32 (THLS-32): It is a scale consisting of 32 questions developed based on the Health Literacy in Eight Europe (HLS-EU) Study Conceptual Framework.[13] The conceptual framework includes "two health-related dimensions (treatment and service, disease

prevention and health promotion)" and "four information-acquiring processes (access, understanding, assessment, and use/application) concerning health-related decision-making and practices." The validity and reliability study in our country was conducted by Okyay et al.[14] The items are expressed as 0: very easy, 1: easy, 2: difficult, 3: very difficult, 4: I have no idea on a 5-point Likert-type scale. It is scored between 0-50. 50 - gives the highest literacy score.

Mindful Eating Questionnaire (MEQ): Developed by Framson et al.[15] in 2009. It aims to examine the relationship between eating behavior, awareness and emotional state. The scale consists of a total of 30 questions. The 5-point Likert Scale (1: never, 2: rarely, 3: sometimes, 4: often, 5: always) was used as adapted by Köse et al.[16] The subscales; disinhibition, emotional eating, control of eating, focusing, eating discipline, mindfulness, and interference were examined under 7 headings. While a high score obtained for each sub-dimension of the scale shows that the participant has the characteristic in which the relevant sub-dimension is evaluated, the scale also measures the total mindful eating score. Questions 1, 7, 9, 11, 13, 15, 18, 24, 25 and 27 are scored directly. The remaining questions are scored in reverse (1=5, 2=4, 3=3, 4=2, 5=1).

Statistical Analysis

The analysis of the research data was conducted using the SPSS 26 program. The descriptive findings in the study were given with numbers, percentages, minimum/maximum values, mean, standard deviation and median values. T test was used to compare two independent groups showing normal distribution. Mann-Whitney U test was used to compare two independent groups not showing normal distribution. Spearman correlation test was used to evaluate the relationships between variables not showing normal distribution. As stated in pages 23, 46, 77 and 79 of the Reliability and Validity Study of Turkiye Health Literacy Scales, index score calculation for matrix components was made for cases where at least 80% of the relevant questions were answered. According to this guideline, a score for the entire sample could not be obtained for each matrix.

RESULTS

Descriptive findings regarding the characteristics of the participants included in the study are presented in Table 1, 2. According to these findings, the average age of the participants was determined as 39.47±10.644, the average age of obesity onset was 22.84±9.430, the average duration of obesity was 16.62±8.880, the average BMI was 43.43±8.915, average height was 163.61±9.630, and average weight was 115±19.697 as seen in Table 1. In Table 2, 82.3% (n=191) of the participants were female and 38.8% (n=90) were high school graduates. 49.1% (n=114) were housewives, 68.5% (n=159) were married, and 60.3% (n=140) earned less than 10 thousand TL per month. 92.7% (n=215) were living with their families, 61.2% (n=142) had known additional medical comorbidities, and 69.8% (n=162) were in the BMI >40 group. 53.9% (n=125) had no history of psychiatric follow-up treatment, and 77.2% (n=179) did not currently have any mental health complaints. 78.4% (n=182) of the participants had a history of eating disorders, with 46.1% (n=107) having night eating, 68.5% (n=159) emotional eating, 14.7% (n=34) binge eating, 24.1% (n=56) grazing, and 19.0% (n=44) having other eating disorders. Among the weight loss methods, the most preferred one is dieting (41.6%; n=229).

Table 1. Participants' information on obesity

	Minimum	Maximum	Mean	SD	Median
Age	18.00	62.00	39.47	10.644	40.00
Obesity onset age	9.00	57.00	22.84	9.430	20.00
Obesity duration	2.00	44.00	16.62	8.880	15.50
Height	108.00	191.00	163.61	9.630	163.00
Weight	77.00	168.00	115.83	19.697	112.00
BMI	30.84	138.89	43.43	8.915	41.96

SD: Standard deviation, BMI: Body-mass index

Table 2. Descriptive findings regarding participant characteristics

		n	%
Sex	Female	191	82.3
	Male	41	17.7
Education	Literate	2	0.9
	Primary	44	19.0
	Middle school	25	10.8
	High school	90	38.8
	University/college	71	30.6
Occupation	Unemployed	18	7.8
	Student	11	4.7
	Housewife	114	49.1
	Worker/civil servant	47	20.3
	Retired	10	4.3
	Freelance/other	32	13.8
Marital status	Single	45	19.4
	Married	159	68.5
	Widow	6	2.6
	Divorced/living separately	22	9.5
Economic income	Under minimum wage	140	60.3
	Above minimum wage	92	39.7
Household	Alone	13	5.6
	Family	215	92.7
	Other	4	1.7
Comorbidity	Yes	142	61.2
	No	90	38.8
BMI	30-34.9	13	5.6
	35-39.9	57	24.6
	>40	162	69.8
Previous psychiatric follow-up treatment	Yes	107	46.1
	No	125	53.9
Current psychological complaint	Yes	53	22.8
	No	179	77.2
Eating disorder history	Yes	182	78.4
	No	50	21.6
Weight loss methods*	Diet	229/232	
	Herbal methods	88/232	
	Sports/exercise	120/232	
	Medication	54/232	
	Acupuncture	48/232	
	Surgery	11/232	

*Due to multiple response options, the number of responses given is greater than the number of samples. BMI: Body-mass index

The distribution of THLS-32 scale categories is given in Table 3. According to these findings; In the general score, 3.0% (n=7) of the participants had insufficient (0-25), 23.7% (n=55) problematic-limited (26-33), 47.8% (n=111) sufficient (34-42), 24.6% (n=57) excellent (43-50) level. In the treatment and service score, 2.2% (n=5) of the participants had insufficient (0-25), 12.9% (n=30) problematic-limited (26-33), 57.3% (n=133) sufficient (34-42), 26.3% (n=61) excellent (43-50) level. In the disease prevention and health promotion score, 6.9% (n=16) of the participants had insufficient (0-25), 9.1% (n=21) had problematic-limited (26-33), 43.5% (n=101) had sufficient (34-42), and 29.3% (n=68) had excellent (43-50) levels.

The statistical findings regarding the MEQ are given in Table 4. According to these findings, it was seen that the total mindful eating score of the participants was 2.90±0.541. The disinhibition score was 2.81±0.994, the emotional eating score was 2.72±1.164, the control of eating score was 2.89±1.004, the focusing score was 3.32±0.476, the eating discipline score was 2.63±0.785, the mindfulness score was 2.77±0.580 and the interference score was 3.40±0.981.

Table 4. Statistical findings regarding the MEQ

Variable	n	Maximum	Mean	SD	Median
Total mindful eating	232	4.07	2.90	0.541	2.90
Disinhibition	232	5.00	2.81	0.994	3.00
Emotional eating	232	5.00	2.72	1.164	2.60
Control of eating	232	5.00	2.89	1.004	2.75
Focusing	232	5.00	3.32	0.476	3.33
Eating discipline	232	4.75	2.63	0.785	2.50
Mindfulness	232	4.20	2.77	0.580	2.80
Interference	232	5.00	3.40	0.981	3.50

MEQ: Mindful Eating Questionnaire, SD: Standard deviation

The characteristics of the participants included in the study and the Spearman correlation analysis findings regarding the THLS-32 and MEQ are given in Table 5. According to these findings, it was found that there was a positive significant relationship between the participants' ages and total mindful eating (r=0.196), disinhibition (r=0.178), eating discipline (r=0.162) and interference (r=0.194); there was a negative significant relationship between the participants' ages and total mindful eating score (r=-0.272), treatment and service score (r=-0.304) and disease prevention and health promotion score (r=-0.214); there was a positive significant relationship between the participants' obesity duration and total Mindful Eating (r=0.257), disinhibition (r=0.179), emotional eating (r=0.235), control of eating (r=0.145) and interference (r=0.159). It was determined that there was a positive significant relationship between the participants' BMI values and emotional eating (r=0.176).

Table 5. Correlation findings between demographic variables and the THLS-32[1] Sub-Scales and MEQ[2] Sub-Scales

		Age	Obesity duration	BMI
General[1]	r	-0.272	-0.110	0.002
	p	0.000	0.095	0.980
	n	230	230	230
Treatment and service[1]	r	-0.304	-0.115	-0.044
	p	0.000	0.083	0.504
	n	229	229	229
Disease prevention and health promotion[1]	r	-0.214	-0.100	0.039
	p	0.001	0.134	0.555
	n	226	226	226
Total mindful eating[2]	r	0.196	0.257	0.073
	p	0.003	0.000	0.266
	n	232	232	232
Disinhibition[2]	r	0.125	0.179	0.071
	p	0.057	0.006	0.278
	n	232	232	232
Emotional eating[2]	r	0.178	0.235	0.176
	p	0.007	0.000	0.007
	n	232	232	232
Control of eating[2]	r	0.036	0.145	0.039
	p	0.588	0.027	0.551
	n	232	232	232
Focusing[2]	r	0.062	0.047	-0.008
	p	0.347	0.473	0.904
	n	232	232	232
Eating discipline[2]	r	0.162	0.113	-0.058
	p	0.013	0.087	0.382
	n	232	232	232
Mindfulness[2]	r	0.045	0.075	-0.024
	p	0.498	0.258	0.720
	n	232	232	232
Interference[2]	r	0.194	0.159	0.068
	p	0.003	0.015	0.302
	n	232	232	232

THLS-32: Turkish Health Literacy Scale-32, MEQ: Mindful Eating Questionnaire, SD: Standard deviation

Table 3. Distribution of THLS-32 Scale categories

Category	General		Treatment and service		Disease prevention and health promotion	
	Number	%	Number	%	Number	%
Inadequate (0-25)	7	3.0	5	2.2	16	6.9
Problematic-limited (26-33)	55	23.7	30	12.9	21	9.1
Adequate (34-42)	111	47.8	133	57.3	101	43.5
Excellent (43-50)	57	24.6	61	26.3	68	29.3

THLS-32: Turkish Health Literacy Scale-32

As a result of the analyses conducted to determine whether there are differences in the THLS-32 and MEQ according to the gender of the participants included in the study, it was determined that there was a significant difference in the disinhibition and emotional eating scores according to the gender of the participants (p<0.05). When the findings were examined; It was determined that the average of men (3.12±1.065) was higher than the average of women (2.74±0.967) in the disinhibition score, and the average of men (3.19±1.160) was higher than the average of women (2.62±1.143) in the emotional eating score.

As a result of the analyses conducted to determine whether there are differences in the THLS-32 and MEQ according to the education levels of the participants included in the study, it was determined that there were significant differences in the general, treatment and service and emotional eating scores according to the education levels of the participants (p<0.05). As a result of the Bonferroni-corrected multiple comparison tests conducted to determine which groups the differences were between; It was determined that the average of university/college graduates in the general health literacy score (38.99±6.691) was higher than the average of those who were only literate (24.74±6.261), the average of university/college graduates in the Treatment and Service score (40.43±6.255) was higher than the average of primary school graduates (37.13±6.757), and the average of primary school graduates in the emotional eating score (3.23±1.188) was higher than the average of high school graduates (2.59±1.088) and university/college graduates (2.57±1.202).

As a result of the analyses carried out to determine whether there were differences according to the participants' BMI levels, it was determined that there was no significant difference in the THLS-32 and MEQ according to the participants' BMI levels (p>0.05).

The analysis findings conducted to determine whether there were any differences in the THLS-32 and MEQ according to the eating disorder history of the participants included in the study are given in Table 6. As a result of the analyses, it was determined that there was a significant difference in the participants' total mindful eating, disinhibition, emotional eating, control of eating and interference scores (p<0.05). When the findings were examined: In the total mindful eating score, the average of those without a history of eating disorders (3.26±0.542) was higher than the average of those with a history of eating disorders (2.80±0.500); In the disinhibition score, the average of those without a history of eating disorders (3.34±0.915) was higher than the average of those with a history of eating disorders (2.66±0.967); in the emotional eating score, the average of those without a history of eating disorders (3.76±0.943) was higher than the average of those with a history of eating disorders (2.44±1.052); In the control of eating score, the average of those without a history of eating disorders (3.19±1.077) was higher than the average of those with a history of eating disorders (2.81±0.970); it was determined that the mean interference score of those without an eating disorder history (3.66±0.966) was higher than the mean of those with an eating disorder history (3.33±0.975).

Table 6. Differences regarding eating disorder history and THLS-32[1] Sub-Scales and MEQ[2] Sub-Scales

Variable	Eating disorder	n	Mean±SD	Average rank	t/Z	p
General[1]	Yes	181	37.58±6.923	115.41	-0.041	0.967
	No	49	37.33±6.634	115.85		
Treatment and service[1]	Yes	180	39.05±6.667	116.45	-0.634	0.526
	No	49	38.22±6.770	109.68		
Disease prevention and health promotion[1]	Yes	178	36.12±8.262	112.96	-0.242	0.809
	No	48	36.38±7.825	115.52		
Total mindful eating[2]	Yes	182	2.80±0.500	104.82	-5.577*	0.000
	No	50	3.26±0.542	159.02		
Disinhibition[2]	Yes	182	2.66±0.967	106.32	-4.414	0.000
	No	50	3.34±0.915	153.54		
Emotional eating[2]	Yes	182	2.44±1.052	100.30	-7.029	0.000
	No	50	3.76±0.943	175.47		
Control of eating[2]	Yes	182	2.81±0.970	110.97	-2.399	0.016
	No	50	3.19±1.077	136.62		
Focusing[2]	Yes	182	3.29±0.484	112.57	-1.718	0.086
	No	50	3.41±0.434	130.82		
Eating discipline[2]	Yes	182	2.58±0.780	113.15	-1.457	0.145
	No	50	2.80±0.786	128.71		
Mindfulness[2]	Yes	182	2.77±0.573	116.23	-0.118	0.906
	No	50	2.79±0.610	117.49		
Interference[2]	Yes	181	3.33±0.975	110.48	-2.420	0.016
	No	50	3.66±0,966	135.98		

*T test, THLS-32: Turkish Health Literacy Scale-32, MEQ: Mindful Eating Questionnaire, SD: Standard deviation

The Spearman correlation analysis findings regarding the relationships between THLS-32 and MEQ are given in Table 7. According to these findings: There is a positive significant relationship (r=0.161) between Disinhibition and disease prevention and health promotion-using/applying information; There is a positive significant relationship (r=0.146) between

Table 7. Inter-Scale correlation findings of THLS-32[1] and MEQ[2]

		Total mindful eating[2]	Disinhibition[2]	Emotional eating[2]	Control of eating[2]	Focusing[2]	Eating discipline[2]	Mindfulness[2]	Interference[2]
General	r	-0.016	-0.002	-0.051	-0.027	0.146	0.036	-0.053	0.022
	p	0.811	0.980	0.441	0.679	0.027	0.589	0.426	0.741
	n	230	230	230	230	230	230	230	229
Treatment and service[1]	r	-0.072	-0.074	-0.110	-0.045	0.137	0.053	-0.070	-0.048
	p	0.278	0.264	0.096	0.502	0.039	0.426	0.290	0.469
	n	229	229	229	229	229	229	229	228
Treatment and service[1]- access to information[1]	r	-0.113	-0.113	-0.109	-0.031	0.116	0.000	-0.109	-0.106
	p	0.100	0.100	0.110	0.656	0.091	0.996	0.113	0.121
	n	215	215	215	215	215	215	215	214
Treatment and service[1] -understanding information[1]	r	-0.033	-0.006	-0.117	-0.045	0.128	0.108	-0.014	0.027
	p	0.633	0.934	0.094	0.521	0.066	0.122	0.838	0.702
	n	206	206	206	206	206	206	206	206
Treatment and service[1]- assessment of information[1]	r	0.011	0.000	-0.105	0.049	0.106	0.086	-0.007	0.078
	p	0.878	0.997	0.139	0.488	0.137	0.229	0.923	0.274
	n	199	199	199	199	199	199	199	198
Treatment and service[1]- use/application of information[1]	r	-0.112	-0.077	-0.120	-0.085	0.077	-0.010	-0.084	-0.106
	p	0.104	0.261	0.081	0.215	0.264	0.888	0.224	0.122
	n	213	213	213	213	213	213	213	212
Disease prevention and health promotion[1]	r	0.034	0.077	0.001	-0.019	0.120	-0.004	-0.021	0.101
	p	0.613	0.250	0.992	0.780	0.072	0.957	0.749	0.129
	n	226	226	226	226	226	226	226	225
Disease prevention and health promotion[1] - access to information[1]	r	-0.011	0.020	-0.051	-0.105	0.167	0.042	-0.028	0.073
	p	0.873	0.779	0.463	0.135	0.017	0.550	0.694	0.298
	n	206	206	206	206	206	206	206	205
Disease prevention and health promotion[1] - understanding information[1]	r	-0.008	0.009	-0.069	-0.036	0.141	0.077	-0.004	0.048
	p	0.908	0.894	0.328	0.607	0.046	0.279	0.954	0.496
	n	202	202	202	202	202	202	202	201
Disease prevention and health promotion[1] - assessment of information[1]	r	-0.057	-0.049	-0.065	-0.063	0.087	0.036	-0.094	-0.002
	p	0.437	0.503	0.375	0.389	0.230	0.621	0.197	0.978
	n	190	190	190	190	190	190	190	189
Disease prevention and health promotion[1] - use/application of information[1]	r	0.095	0.161	0.089	0.024	0.072	-0.023	-0.079	0.124
	p	0.182	0.023	0.212	0.739	0.313	0.743	0.267	0.083
	n	199	199	199	199	199	199	199	198
Access to health-related information[1]	r	-0.052	-0.047	-0.053	-0.076	0.154	0.041	-0.075	-0.023
	p	0.438	0.478	0.425	0.255	0.020	0.544	0.261	0.737
	n	226	226	226	226	226	226	226	225
Understanding health-related information[1]	r	-0.005	0.012	-0.094	-0.039	0.157	0.113	-0.008	0.037
	p	0.937	0.854	0.161	0.559	0.019	0.094	0.902	0.584
	n	222	222	222	222	222	222	222	221
Assesment of health-related information[1]	r	-0.042	-0.035	-0.107	-0.033	0.111	0.035	-0.071	0.040
	p	0.536	0.610	0.115	0.628	0.101	0.608	0.299	0.559
	n	218	218	218	218	218	218	218	217
Using/applying health-related information[1]	r	-0.004	0.047	0.007	-0.026	0.052	-0.067	-0.083	0.014
	p	0.954	0.484	0.914	0.694	0.432	0.318	0.214	0.836
	n	227	227	227	227	227	227	227	226

THLS-32: Turkish Health Literacy Scale-32, MEQ: Mindful Eating Questionnaire

focusing and general health literacy score; There is a positive significant relationship between focusing and treatment and service score (r=0.137), disease prevention and health promotion-access to information score (r=0.167), disease prevention and health promotion-understanding information score (r=0.141), access to health-related information score (r=0.154), and understanding health-related information score (r=0.157).

DISCUSSION

Obesity is one of the most important health problems in Turkiye as well as all over the world. This study aimed to investigate the relationship between health literacy and mindful eating in obese patients. 232 patients participated in the study and it was determined that the number of women (n=191) was higher than men (n=41). Although it is known that the prevalence of obesity is higher in women, in line with the literature, the female rate is also high in our study.[17]

It is predicted that obesity will continue to be a significant global health problem in the coming years, and it is important to determine the controllable individual factors that cause obesity.[18] Health literacy, which causes people to make healthier choices throughout their lives and to be more careful about healthy nutrition, is an important variable that can be improved. In previous studies, the health literacy level of adults in our country has been determined to vary between 6% and 72.9%, and many studies have stated that health literacy is at an inadequate level.[4]

Health literacy is not merely the acquisition of information; it is also recognized as a cognitive and social competency that guides individuals in making informed health-related decisions. Recent meta-analyses have demonstrated that low levels of health literacy may lead to adverse health outcomes, particularly in relation to obesity and other chronic diseases.[13]

Health literacy has been examined in community-based samples in chronic patients and various groups, but there are not many studies conducted on obese patients.[4] In our study, it was found that 3.0% (n=7) of the participants had inadequate (0-25), 23.7% (n=55) problematic-limited (26-33), 47.8% (n=111) sufficient (34-42), and 24.6% (n=57) excellent levels of health literacy in obese patients.

In a study evaluating health literacy and obesity-related behaviors in obese patients, it was determined that 71.4% of the individuals had inadequate health literacy levels and 28.6% had sufficient levels.[4] In another study conducted on obese patients, it was observed that 31% of them had "insufficient" health literacy, 37.7% had "problematic/limited" health literacy, 21.1% had "sufficient" health literacy, and 10.2% had "excellent" health literacy.[5] The results obtained from our study were found to be partially different from the literature. The fact that the health literacy of obese patients was 46.7% sufficient may be related to the fact that the patient group studied applied to a treatment center that has an important place in obesity treatment and that they were a patient group that sought treatment. To our knowledge, this study is the first study to examine the relationship between health literacy and mindful eating in obese patients.

Obesity is seen as a behavioral problem associated with uncontrolled eating. Mindful eating is a healthy weight control tool that comes to the forefront by trying to change unhealthy eating behaviors and is an alternative approach to weight loss methods.[19] Studies on obesity, eating behavior, and body weight management with mindful eating have shown that mindfulness practices provide improvement in eating behavior and are effective in losing body weight in obese individuals.[20,21]

In our study, when the mindful eating scores of the patients were examined, it was seen that the average MEQ score of the participants was 2.90±0.541 (Total score 87±16.23). The relationship between obesity and mindful eating has been studied mostly in student and young samples. In a study conducted with university students, the students' average MEQ total score was found to be high at 97.63±13.26. In another study, the average MEQ total score was found to be 98.11±13.81 in the general population.[22,23] In our study, it was observed that the MEQ total scores of the obese patients were lower than the mindful eating scores in the studies conducted with the general population and students. This situation suggests that eating behaviors among individuals with obesity tend to be more automatic and are maintained at a lower level of awareness.[24]

Mindful eating and health literacy are affected by variables such as individuals' individual characteristics and socioeconomic status. In a study conducted on healthcare professionals, it was found that as the participants' ages increased, the scores of "disinhibition", "discipline of eating", "interference" increased and the total score of "MEQ" decreased.[25] In our study, it was found that the total mindful eating, emotional eating, discipline of eating and interference scores increased as the participants' ages increased. It was found that there was a positive and significant relationship between the duration of obesity and total mindful eating, disinhibition, emotional eating, control of eating and interference. Although this situation contradicts the fact that the patients continued to be obese, it may indicate that the patients' attention to mindful eating may have increased along with their exposure to obesity and their search for treatment. Some studies have observed that as the duration of obesity increases, individuals may experience greater awareness of their eating behaviors; however, this heightened awareness does not always translate into actual behavioral change.[26]

In studies evaluating mindful eating, the relationship between mindful eating and BMI has been frequently emphasized[21]. The results of studies examining the relationship between BMI and mindful eating are quite different. In some studies, mindful eating scores decreased with increasing BMI,[22] while in some other studies, there was no relationship between these two or it has been stated that as the BMI value increases, the total scale score decreases, but this difference is not statistically significant.[16]

In our study, unlike other studies, it was found that mindful eating scores increase as BMI increases. This finding contradicts the general trend in the literature and represents an unexpected result. It suggests that while eating awareness may be increasing among individuals with obesity, this increase

has not yet fully translated into healthy eating behaviors. In line with the concept of the "awareness-performance gap", individuals may develop a cognitive awareness of the need to change unhealthy eating habits, yet the translation of this awareness into behavior may occur gradually and over time.[27] Systematic reviews indicate that mindful eating interventions may have limited long-term effectiveness in producing sustained behavioral changes in eating patterns.[28] Although individuals with higher BMI are generally thought to exhibit lower levels of mindful eating, studies have emphasized that BMI alone is not a sufficient determinant, and should be interpreted alongside individual and cognitive factors.[29]

When we look at the changes in mindful eating according to gender in our study, it was found that disinhibition and emotional eating scores were higher in men. There are different results in the literature regarding the relationship between gender and mindful eating. In some studies, it was determined that men have higher "emotional eating" scores than women and women have higher "discipline of eating" scores than men; there are also other studies showing that men have higher "emotional eating" scores than women and "control of eating", "focusing" and "discipline of eating" scores are lower than women.[25] When other studies with different samples and different numbers of participants are examined, it was seen that the MEQ scale scores did not show a significant difference according to gender.[16]

A very few studies have compared obesity-related factors with health literacy. Health literacy defines both cognitive and social skills that affect an individual's access to health services during the process of protecting, improving and treating their health in case of deterioration. Health literacy may vary depending on many personal and cultural variables.[4] In recent studies, a positive association has been identified between digital health literacy and nutritional awareness, which appears to positively influence individuals' ability to make healthy decisions.[30]

In our study, as the age of the participants increased, the health literacy general score, treatment and service score, and disease prevention and health promotion score decreased; when examined in terms of gender and BMI, it was understood that there was no significant difference, and higher scores were obtained in the more educated group in the general score and treatment service score. In most studies evaluating health literacy, it is reported that health literacy scores decrease with age.[31] Similarly, it can be said that health literacy increases as the level of education increases, and all studies on the determinants of health literacy agree that "level of education" is the key determinant.[32]

It can be said that individuals with a high level of education have high general literacy skills, the ability to access, understand and apply health-related information, and the ability to comment with an investigative and critical perspective by obtaining information from different sources. It can be generalized that as the level of education increases, individuals can better access and understand the information they are curious about about their health.[32]

Eating disorders are frequently seen together with disturbed eating behaviors in obesity. In our study, it was determined that 182 out of 232 patients had at least one eating disorder. Consistent with the literature and expected[33] it was determined that the total mindful eating, disinhibition, emotional eating, control of eating and interference scores of those with eating disorders were statistically significantly high, but no relationship was found between the presence of an eating disorder and the health literacy total score and its subscales. This finding suggests that health literacy alone may not be sufficient to positively influence eating behaviors. Although individuals may possess the necessary knowledge, they may still struggle to translate this knowledge into actual behavior. In eating disorders, emotional regulation difficulties, in addition to cognitive factors, are known to play a significant role. Therefore, information-based approaches alone may be inadequate, and comprehensive interventions supported by psychoeducation are required.[34]

Finally, when the relationship between health literacy and mindful eating was evaluated in our study, it was seen that there was a positive significant relationship between mindful eating and health literacy in the total scores, and between the sub-dimensions of health literacy such as preventing diseases and improving health and accessing and understanding information, accessing and understanding health-related information.

These findings indicate that health professionals should not solely focus on biomedical interventions, but also consider individuals' abilities to access health information and their levels of awareness.[35] Programs developed in this direction may contribute to sustainable behavioral changes in obesity treatment. The results suggest that the integration of individuals' competencies in accessing, understanding, and applying health information, along with their awareness of eating behaviors, is essential in the design of effective treatment processes.[36] This study, particularly conducted with treatment-seeking individuals in a clinical context, is believed to offer a valuable contribution to the literature.[37] In line with systematic approaches, a joint consideration of health literacy levels, access to treatment, and mindful eating behaviors can provide a framework for effective and sustainable interventions in the fight against obesity.[27]

This study examined the relationship between health literacy and mindful behavior and was not designed to make causal inferences. Therefore, the use of longitudinal designs in future studies will increase the validity and reliability of the findings. In particular, the use of structured observation protocols and objective measurement tools scored by independent raters will reduce the limitations of self-reported data. In addition, experimental designs, especially randomized controlled trials are needed to evaluate the effects of mindfulness-based interventions. Such studies will allow a more robust assessment of the causal relationships between variables such as cognitive mindfulness, emotional eating, and health literacy. Thus, the effects of psychoeducational interventions in obesity management can be more reliably demonstrated.

Limitations

This study has some methodological and sample-based limitations. First, the inclusion of individuals who only applied to an obesity center resulted in the sample consisting of individuals who were seeking treatment and had high health motivation, limiting the generalizability of the findings. This may have created a sample bias, especially in awareness-based variables such as health literacy and conscious eating. Second, however, the fact that the sample consisted of voluntary participants may have introduced a potential selection bias and could limit the generalizability of the findings. Third, the fact that the data were based on self-reporting may have been affected by sources such as social desirability, response bias, and recall errors. Fourth, since variables such as health literacy have multidimensional structures, cultural, digital, and cognitive components could not all be controlled in this study. Fifth, the cross-sectional design of the study does not allow for the evaluation of causal relationships between variables, allowing interpretation only at the level of the relationship. Finally, the high proportion of female participants in the sample may have limited the power of gender-based analyses.

CONCLUSION

The approach to obesity and disordered eating behaviors, as well as their treatment, constitutes a complex and multidimensional process. In recent years, innovative strategies focusing on mindfulness, mindful eating, and healthy nutrition have gained increasing importance in managing these conditions. A fundamental requirement in this context is that individuals know, learn, or receive education about what a healthy diet entails. One of the most effective tools in acquiring and maintaining such knowledge and behaviors is a high level of health literacy. In addition to identifying the psychological and individual factors associated with obesity, enhancing health literacy through nutrition education and mindfulness-based practices may contribute to a more effective, lasting, and sustainable weight management process in individuals with obesity. In this regard, understanding the relationship between health literacy and mindful eating can facilitate the development of personalized nutritional interventions, supporting the creation of more targeted and behaviorally oriented treatment plans in clinical practice. These findings underscore the importance of designing interventions that promote mindful eating behaviors while taking individuals' health literacy levels into account in the treatment of obesity.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of the Ankara Etlik City Hospital Scientific Researches Evaluation and Ethics Committee (Date: 14.08.2024, Decision No: AEŞH-BADEK-2024-659.

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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