

PAPER DETAILS

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Overweight and Obese Patients' Attitudes Towards Anti-Obesity Treatments, and Attitude Associated Factors

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Objective: Obesity is a public health problem with a rising prevalence. When lifestyle modifications, diet, and exercise fail, anti-obesity medications and surgeries are treatment options. However, they seem to be underutilized, due in part to patients' attitudes towards these modalities. This study aimed to investigate patients' attitudes toward these treatments.

Materials and Methods: A descriptive survey was conducted in a face-to-face fashion. Weight perception, prior weight loss trials, exercise and dietary treatments, perceptions related to obesity and its treatment, and demographic factors, were assessed in relation to anti-obesity medications and surgical treatments. Perception was analyzed both verbally and visually. Misperception was defined as being thinner than reality misperceptions (TTRM), fatter than reality misperceptions (FTRM), or either of them (ETFTRM).

Results: 198 participants completed the survey. 30.8% and 23.7% of the participants would consider anti-obesity medications and surgeries, respectively. Females were more likely to consider anti-obesity medications (43.9% vs. 21.6%, $p = 0.001$). Patients who had exercised to lose weight were more likely to consider anti-obesity surgery (28.9% vs. 16.7%, $p = 0.04$). Appropriate weight perception was 16.2%. Weight misperception was not associated with higher or lower rates of anti-obesity treatments. However, among the patients in the highest body mass index (BMI) group ($BMI > 35$), participants with pure-TTRM were more likely to consider anti-obesity medications (66.7% vs. 18.8%, $p = 0.01$).

Conclusion: Medical and surgical obesity treatments are considered at a low rate among candidates or at-risk patients. Age, gender, exercise history, and pure-TTRM were associated with higher treatment considerations.

Keywords: Weight perception, Obesity, Obesity management, Anti-obesity agents, Bariatric surgery

1. INTRODUCTION

Obesity is defined as "the excess weight that poses a risk to one's health" and is a common public health problem among both developed and developing countries.¹ Turkey is a country with a high number of overweight and obese patients.² Various factors exist with regards to rising obesity rates in the last decades, such as easy access to food and a sedentary lifestyle, namely the adoption of a western lifestyle.³ Obesity treatment starts with lifestyle modification, diet, and exercise, and they

form the backbone of the treatment plans. When response to the aforementioned treatments is inadequate, medical treatments (e.g., glucagon-like peptide-1 receptor agonists, namely GLP-1 RAs) or surgical treatments (e.g., sleeve gastrectomy) are valid and proven options with moderate to high efficacy.^{4,5} However, these latter modalities seem to be underutilized when taking into consideration the rates of obesity.^{6,7} Several studies around the globe have shown that various barriers exist with regards to the utilization of these treatments, that

is, weight stigma, surgery-related stigma, cost-related issues, misconceptions about the safety and efficacy of surgery, as well as consideration of obesity surgery as a cosmetic procedure.^{6,8-12} However, no study regarding barriers to the utilization of obesity treatment was conducted in Turkey.

Weight perception is defined as how one perceives their weight and physical appearance.¹³ It is known that weight perception changes are common, particularly among youngsters.^{14,15} Besides, it is associated with psychiatric disorders.^{13,15-17} More interestingly, studies demonstrated that youngsters who have weight misperceptions were less likely to try weight loss.¹⁸ Since only a few studies exist with regards to weight misperception in Turkey, and belong to adolescents.¹⁹, we have started a project about weight misperception in the adult population. We had planned a two-part study, in which the first part consisted of determinants of weight misperception (under review, to be published), and the second part (the current study) consisted of attitudes towards obesity treatment, related factors, and the association of weight misperception with obesity treatment. In the first part of the project, we have shown that weight misperception is very common among the Turkish population and is associated with low education levels, a higher BMI, and age.

In this study, we incorporated the findings from the prior study in order to put forth attitudes towards obesity treatment, find associated factors, and investigate whether weight misperception is associated with attitudes towards obesity medications and surgery.

2.METHODOLOGY

Design and Setting

This study was designed as a descriptive research survey and formed the second part of our weight misperception research, which was planned as a

two-step study. Survey questions and structures were designed with the help of data acquired during the first step of the study (to be published). Participants aged 18 to 65 were asked whether they would want to participate in the study. If they opted to participate, then written informed consent was obtained. The participants were given an anonymous survey number and proceeded with the questions. No identifying name or number was obtained. The survey took approximately ten minutes to complete. Since this study's aim was to investigate weight misperception's effect on attitudes towards obesity management strategies, only participants with a BMI over 25 kg/m² were included in the study.

Survey

The survey consisted of 15 questions. Surveys were performed by the four researchers (BK, NŞ, AÖ, and TIG) and took place in public places such as bus stops, cafés, parks, shopping malls, etc. All questions were read by the researcher, and each question was explained in detail to participants. The survey questions were as follows:

1. Age, and sex (Participants were asked to answer their biological sex, namely as female or male)
2. Weight (kilograms), height (centimeters), and BMI (kg/m²)
3. Education status:
 - Primary school or below
 - Middle or high school
 - College degree and above
4. Marital status:
 - Single
 - Married
 - Divorced

- Widow
5. Have you ever tried to lose weight before?
 - No
 - Yes, once
 - Yes, twice or more
 6. (If the former question's answer is yes, ask then) Were you successful at losing weight?
 - No
 - Partially yes
 - Totally yes
 7. Have you ever visited dietitian before with the purpose of losing weight?
 - No
 - Yes, once
 - Yes, twice or more
 8. Have you ever exercised before with the purpose of losing weight?
 - No
 - Yes, once
 - Yes, twice or more
 9. Have you ever used medication with the purpose of losing weight?
 - No
 - Liraglutide
 - Orlistat
 - Herbal remedies
 10. (If the former question's answer is no, ask then) (If BMI < 30kg/m², then start with "**if you were obese**") Would you consider using anti-obesity medication with the purpose of losing weight?
 - I would not consider
 - I would consider
 - No opinion
 11. (If BMI < 30kg/m², then start with "**if you were obese**") Would you consider anti-obesity surgery with the purpose of losing weight?
 - I would not consider
 - I would consider
 - No opinion
 12. How important do you think obesity is?
 - Totally unimportant
 - Partially unimportant
 - Neither unimportant or important
 - Partially important
 - Totally important
 13. How hard do you think it is to treat obesity?
 - Totally hard
 - Partially hard
 - Neither hard or easy
 - Partially easy
 - Totally easy
 14. Verbal weight perception: Patients were asked to describe themselves as one of the following: (The question was read twice to make sure patients comprehended it correctly)
 - Underweight
 - Normal-weighted
 - Overweight
 - Mildly obese
 - Severely obese
 15. Visual weight perception: A previously developed and validated body size guide (BSG) was used for visual weight perception analysis.²⁰ This scale was used in our first weight misperception study (to be published) as well. The BSG provides separate instructions for male and female participants. Each BSG features a

consistent portrayal of a male or female model, depicting their figure from being underweight to grossly obese. There are a total of 10 images for both males and females. The initial image depicts underweight individuals, while the second and third images portray individuals with a normal weight. The fourth image represents those who are overweight. The fifth and sixth images depict individuals with class I obesity, while the seventh and eighth pictures portray individuals with class II obesity. The final two images represent individuals with class III obesity. Given that we categorized the BMI of obese patients into two groups: mildly obese and severely obese, and the verbal weight perception question also classified obesity into two groups: mildly obese and severely obese, we assigned the seventh image from the visual weight perception question to the mildly obese group and the eighth image to the severely obese group, based on the patients' responses. Patients were presented with images based on their gender and instructed to identify the image that they perceived as most resembling themselves. Patients were instructed to carefully and thoroughly analyze all photos. The researchers stated that all the photos depict the same individual, although they differ in size, ranging from underweight to severe obesity.

Appropriate Perception and Misperceptions

We used the same methodology as our first study to define appropriate weight perception and misperceptions, which were defined as follows:

- Appropriate perception (AP) is described as the alignment between one's actual body mass index (BMI) and their responses to questions about their weight perception, both visually and verbally. For instance, if a patient's BMI was determined to be 32.5 kg/m² (indicating mild obesity), they verbally acknowledged themselves as mildly obese and identified images numbered 5, 6, or 7 in their visual BSG, they were categorized as having "appropriate perception".
- The categorization of misperceptions was complex, requiring multiple classifications due to the following factors: Firstly, misperception refers to the cognitive process of perceiving oneself as either "thinner" or "fatter" than the actual truth. Furthermore, misconceptions can manifest either through visual cues, verbal communication, or a combination of both. Ultimately, individuals may see themselves as having a slimmer appearance visually, a larger one when spoken orally, or vice versa. The term "misperception" was employed as a comprehensive phrase to include both verbal and visual misinterpretations of perceiving oneself as slimmer or fatter than the actual truth. Five subgroups were established to categorize individuals based on their perspective of being thinner or fatter. These subgroups are referred to as t-SG and f-SG, representing thinner and fatter perceptions, respectively. These subgroups were designed to cover all possible perceptions.
 - t-SG1, no thinner than reality misperception: The patient does not perceive themselves as thinner than reality, both verbally and visually. However, they could perceive accurately or fatter than reality. f-SG1 constitutes the opposite of t-SG1.
 - t-SG2, visual misperception, verbal accurate perception: The patient perceives themselves thinner than reality on the BSG chart but answers the verbal weight perception question appropriately. f-SG2 constitutes the opposite of t-SG3.
 - t-SG3, verbal misperception, visual accurate perception: The patient perceives themselves thinner than reality when the verbal weight perception question is asked,

but points out an appropriate image on the BSG chart. f-SG4 constitutes the opposite of t-SG4.

- t-SG4, both visual and verbal misperception: The patient perceives themselves as thinner than reality when the verbal weight perception question is asked and points to a thinner than reality image on the BSG chart. f-SG4 constitutes the opposite of t-SG4.
- SG5, visual and verbal misperceptions oppose: The patient perceives themselves as thinner than reality when the verbal weight perception question is asked and points to a fatter than reality image on the BSG chart, or vice versa.

Thinner than reality misperception (TTRM) was divided into 2 categories: any-TTRM, which included subgroups 2, 3, and 4 (t-SG2, t-SG3, and t-SG4), and pure-TTRM, which included subgroup 4 (t-SG4) only. Fatter than reality misperception (FTRM) was also divided into 2 categories: any-FTRM, which included subgroups 2, 3, and 4 (f-SG2, f-SG3, and f-SG4), and pure-FTRM, which included subgroup 4 (f-SG4) only. Due to the presence of contradictory and inconsistent responses in SG5, it was excluded from the TTRM and FTRM. Not having verbal and visually appropriate perception is categorized as either thinner or fatter than reality misperception (ETFTRM) and calculated as “patients with appropriate perception subtracted from all patients”.

Statistics

Categorical and continuous variables were analyzed via descriptive statistical methods. Differences between groups and categorical determinants were analyzed using Pearson’s chi-squared test (χ^2 test) (or Fisher’s exact test if needed). Differences between continuous variables were analyzed using the student’s t-test or Mann-Whitney U test, according to the distribution patterns of two

groups. Continuous variables were presented as “mean (\pm standard deviation)” or “median (inter-quartile range)” according to distribution patterns. Categorical variables were presented as “numbers (percentages)”. Two-sided significance testing was performed to calculate p-values, and p-values less than 0.05 were considered significant. Since we did not have robust data to calculate sample size prior to the survey, we could not conduct sample size analysis. All analyses were conducted using IBM SPSS Software version 23.0 (SPSS Inc., Chicago, IL).

Ethics

Participants were assigned an anonymous survey number to protect confidentiality. Written informed consent was obtained prior to survey initiation. The study complies with the principles outlined in the Declaration of Helsinki, and this study was approved by the Başkent University Institutional Review Board (Project number KA24/42).

3.RESULTS

Baseline Survey Results

One hundred and ninety-eight participants, with a median age of 46, responded to the survey. Of the participants, there was a slight male dominance. The median BMI was 29.3 and was similar across the sexes. While the majority of the participants had a college degree, less than one-third had a middle or high school degree, and only a fraction of the participants had either a primary school degree or a degree below.

More than three-fourths of the participants had tried to lose weight before, of whom more than 85% were successful. Less than one-third of the participants had visited dietitians before with the purpose of losing weight, and a little more than half of the participants had exercised before with the purpose of losing weight. More than 88% of

the participants had never used medication with the purpose of losing weight. Of the users, 13 had used herbal remedies, 7 had used orlistat, and only 2 had used liraglutide.

Regarding attitudes toward anti-obesity treatments, 30.8% of the participants would consider anti-obesity medications, whereas 23.7% would consider anti-obesity surgery for weight loss. More than four-fifths of the participants think obesity is a totally important disease, and more than 65% think that it is either partially or totally hard to treat obesity.

In terms of weight perception, while 47.5% of the participants responded as overweight verbally, 50% of the participants responded as mildly obese

when asked visually. Table 1 demonstrates the baseline survey results in detail.

Weight Misperception

One hundred and sixty-six of the participants (83.8%) had either thinner or fatter than reality misperception (ETFTRM), which translates into the fact that only 16.2% of the participants had appropriate weight perception. Thinner than reality misperception (TTRM) was more common compared to fatter than reality misperception (FTRM), both in “any” type misperception and “pure” type misperception. Regarding the former type, 49% had any TTRM, and 34.8% had any FTRM. Regarding the latter type, 21.2% had pure TTRM and 1.5% had pure FTRM. Table 2 demonstrates the weight misperception types of the participants in detail.

Table 1.

Participants’ characteristics according to the survey

Questions	Choices/Answers	Values*
Age		46 (20)
Sex	Female Male	(41.4%) 116 (58.6%)
Body mass index (continuous)	Female Male	29.1 (5.1) 29.5 (4.1)
Body mass index (categorical)	25.0 – 29.9 30.0 – 34.9 35 and over	111 (56.1%) 59 (29.8%) 28 (14.1%)
Education status	Primary school or below Middle or high school College degree and above	14 (7.1%) 63 (31.8%) 121 (61.1%)
Marital status	Married Single Divorced Widowed	146 (73.7%) 30 (15.2%) 11 (5.6%) 11 (5.6%)
Have you ever tried to lose weight before?	Yes (either once or more)	155 (78.3%)
Were you successful at losing weight?	Yes (either partially or totally)	133 (85.8%)
Have you ever visited dietitian before with the purpose of losing weight?	Yes (either once or more)	60 (30.3%)
Have you ever exercised before with the purpose of losing weight?	Yes (either once or more)	114 (57.6%)

Have you ever used medication with the purpose of losing weight?	No Liraglutide Orlistat Herbal remedies	176 (88.9%) 2 (1%) 7 (3.5%) 13 (6.6%)
Would you consider using anti-obesity medication with the purpose of losing weight?	I would not consider I would consider No opinion	113 (57.1%) 61 (30.8%) 24 (12.1%)
Would you consider anti-obesity surgery with the purpose of losing weight?	I would not consider I would consider No opinion	134 (67.7%) 47 (23.7%) 17 (8.6%)
How important do you think obesity is?	Totally unimportant Partially unimportant Neither unimportant or important Partially important Totally important	6 (3%) 1 (0.5%) 8 (4%) 15 (7.6%) 168 (84.8%)
How hard do you think it is to treat obesity?	Totally hard Partially hard Neither hard or easy Partially easy Totally easy	80 (40.4%) 50 (25.3%) 43 (21.7%) 17 (8.6%) 8 (4%)
Verbal weight perception	Underweight Normal-weighted Overweight Mildly obese Severely obese	2 (1%) 69 (34.8%) 94 (47.5%) 26 (13.1%) 7 (3.5%)
Visual weight perception	Underweight Normal-weighted Overweight Mildly obese Severely obese	1 (0.5%) 28 (14.1%) 39 (19.7%) 99 (50%) 31 (15.7%)

* Values are either shown as median (interquartile range) or frequency (percentage%)

Table 2.

Weight misperception types of the participants

Weight Misperception Type	Frequency
Any TTRM	97 (49%)
Pure TTRM	42 (21.2%)
Any FTRM	69 (34.8%)
Pure FTRM	3 (1.5%)
ETFTRM	166 (83.8%)

ETFTRM: Either thinner or fatter than reality misperception, FTRM: Fatter than reality misperception,

TTRM: Thinner than reality misperception

Characteristics of the Participants Who Would Consider Anti-Obesity Medications

Female responders would consider anti-obesity medications more than males (43.9% vs. 21.6%, $p = 0.001$), and participants who would consider anti-obesity medications had a statistically significantly lower age compared to participants who would not (42 vs. 47, $p = 0.05$). Education and marital status, weight loss trial and success, dietitian visit and exercise history, obesity importance, and hardness thoughts were not different across two groups (all $p > 0.05$). However, participants who had ever

used anti-obesity medications with the purpose of losing weight were more likely to use anti-obesity medications (72.7% vs. 25.6%, $p < 0.001$). Moreover, participants who would consider anti-obesity medication for obesity treatment were also more likely to consider anti-obesity surgery (59.6% vs. 21.6%, $p < 0.001$). Weight misperceptions, however, were not different between different participant attitudes (all $p > 0.05$). Table 3 demonstrates the characteristics of the participants with a positive attitude towards anti-obesity medications in detail.

Table 3.

Association of positive anti-obesity medication treatment attitude and presence of clinicosocial determinants

Determinant	Choices/Answers	Value	p*
Age		42 (18) vs. 47 (21)	0.05
Sex	Female Male	36 (43.9%) 25 (21.6%)	0.001
Education status	Primary school or below Middle or high school College degree and above	6 (42.9%) 20 (31.7%) 35 (28.9%)	0.55
Marital status	Married Single Divorced Widowed	43 (29.5%) 11 (36.7%) 5 (45.5%) 2 (18.2%)	0.46
Have you ever tried to lose weight before?	Yes (either once or more) No	52 (33.5%) 9 (20.9%)	0.11
Were you successful at losing weight?	Yes (either partially or totally) No	42 (31.6%) 10 (45.5%)	0.2
Have you ever visited dietitian before with the purpose of losing weight?	Yes (either once or more) No	20 (33.3%) 41 (29.7%)	0.61
Have you ever exercised before with the purpose of losing weight?	Yes (either once or more) No	32 (28.1%) 29 (34.5%)	0.33
Have you ever used medication with the purpose of losing weight?	Yes (any) No	16 (72.7%) 45 (25.6)	<0.001

How important do you think obesity is?	Totally unimportant Partially unimportant Neither unimportant or important Partially important Totally important	2 (33.3%) 0 2 (25%) 2 (13.3%) 55 (32.7%)	0.55
How hard do you think it is to treat obesity?	Totally hard Partially hard Neither hard or easy Partially easy Totally easy	26 (32.5%) 14 (28%) 12 (27.9%) 6 (35.3%) 3 (37.5%)	0.94
Would you consider anti-obesity surgery with the purpose of losing weight?	I would not consider I would consider No opinion	29 (21.6%) 28 (59.6%) 4 (23.5%)	<0.001
Any TTRM	Yes No	30 (30.9%) 31 (30.7%)	1
Pure TTRM	Yes No	17 (40.5%) 44 (28.2%)	0.12
Any FTRM	Yes No	23 (33.3%) 38 (29.5%)	0.57
Pure FTRM	Yes No	0 61 (31.3%)	0.55
ETFTRM	Yes No	53 (31.9%) 8 (25%)	0.43

*p values with a statistical significance are shown in bold

ETFTRM: Either thinner or fatter than reality misperception, FTRM: Fatter than reality misperception, TTRM: Thinner than reality misperception

Characteristics of the Participants Who Would Consider Anti-Obesity Surgery

Similar to participants who have positive attitudes towards anti-obesity medications, participants who would consider anti-obesity surgery as a weight loss treatment modality were also younger than participants who would not consider it (43 vs. 47, $p = 0.02$). Although the percentage of females who would consider surgery was also higher, this did not reach statistical significance (29.3% vs. 19.8%, $p = 0.12$). Education and marital status, weight loss trial and success, dietitian visit, exercise history, obesity importance, and hardness thoughts were not different across the two groups.

However, participants who had exercised before with the purpose of losing weight were more likely to consider anti-obesity surgery (28.9% vs. 16.7%, $p = 0.04$). Similar to higher anti-obesity medication consideration, participants who had ever used medications with the purpose of weight loss were more likely to consider anti-obesity surgery (45.5% vs. 21%, $p = 0.01$). Moreover, participants who would consider anti-obesity surgery were also more likely to consider anti-obesity medication with the purpose of losing weight (45.9% vs. 14.2%, $p < 0.001$). Similar to anti-obesity medication considerations, anti-obesity surgery considerations were not affected by the presence of weight

misperception (all $p > 0.05$). Table 4 demonstrates the characteristics of the participants with a positive attitude towards anti-obesity surgery in detail.

Obesity Treatment Considerations According to BMI Levels

Anti-obesity medication and surgery considerations did not differ according to weight misperception presence in the total cohort, but we also wanted to test whether this finding also

applies to all BMI levels. Regarding participants with a BMI of 35.0 and over, those with a pure TTRM were also more likely to consider anti-obesity medications (66.7% vs. 18.8%, $p = 0.01$). No other differences were demonstrated with BMI subgrouping. Table 5 demonstrates the association between weight misperception types and obesity treatment considerations according to different body mass index levels.

Table 4.

Association of positive anti-obesity surgery treatment attitude and clinicosocial determinants

Determinant	Choices/Answers	Value	p*
Age		43 (17) vs. 47 (21)	0.02
Sex	Female Male	24 (29.3%) 23 (19.8%)	0.12
Education status	Primary school or below Middle or high school College degree and above	3 (21.4%) 20 (31.7%) 24 (19.8%)	0.19
Marital status	Married Single Divorced Widowed	36 (24.7%) 7 (23.3%) 3 (27.3%) 1 (9.1%)	0.69
Have you ever tried to lose weight before?	Yes (either once or more) No	37 (23.9%) 10 (23.3%)	0.99
Were you successful at losing weight?	Yes (either partially or totally) No	30 (22.6%) 7 (31.8%)	0.34
Have you ever visited dietitian before with the purpose of losing weight?	Yes (either once or more) No	18 (30%) 29 (21%)	0.17
Have you ever exercised before with the purpose of losing weight?	Yes (either once or more) No	33 (28.9%) 14 (16.7%)	0.04
Have you ever used medication with the purpose of losing weight?	Yes (any) No	10 (45.5%) 37 (21%)	0.01
How important do you think obesity is?	Totally unimportant Partially unimportant Neither unimportant or important Partially important Totally important	1 (16.7%) 0 0 2 (13.3%) 44 (26.2%)	0.35

How hard do you think it is to treat obesity?	Totally hard Partially hard Neither hard or easy Partially easy Totally easy	25 (31.3%) 11 (22%) 6 (14%) 3 (17.6%) 2 (25%)	0.26
Would you consider anti-obesity medication with the purpose of losing weight?	I would not consider I would consider No opinion	16 (14.2%) 28 (45.9%) 3 (12.5%)	<0.001
Any TTRM	Yes No	23 (23.7%) 23 (23.8%)	0.99
Pure TTRM	Yes No	11 (26.2%) 36 (23.1%)	0.67
Any FTRM	Yes No	13 (18.8%) 34 (26.4%)	0.23
Pure FTRM	Yes No	1 (33.3%) 46 (23.6%)	0.55
ETFTRM	Yes No	36 (21.7%) 11 (34.4%)	0.12

*p values with a statistical significance are shown in bold

ETFTRM: Either thinner or fatter than reality misperception, FTRM: Fatter than reality misperception, TTRM: Thinner than reality misperception

Table 5.

Presence of weight misperception types and positive attitude⁺ toward obesity treatment types, according to different body mass index levels

	BMI = 25.0 – 29.9		BMI = 30.0 – 34.9		BMI = 35 and over	
Anti-obesity Medication	WM + vs. VM -	p*	WM + vs. VM -	p*	WM + vs. VM -	p*
Any TTRM	35.3% vs. 36.4%	0.91	46.7% vs. 63.6%	0.24	91.7% vs. 68.8%	0.14
Pure TTRM	17.6% vs. 19.5%	0.82	20% vs. 15.9%	0.71	66.7% vs. 18.8%	0.01
Any FTRM	55.9% vs. 49.4%	0.52	26.7% vs. 18.2%	0.48	0 vs. 0	NA
Pure FTRM	0 vs. 3.9%	0.24	0 vs. 0	NA	0 vs. 0	NA
ETFTRM	91.2% vs. 85.7%	0.42	73.3% vs. 81.8%	0.48	91.7% vs. 68.8%	0.14
Anti-obesity Surgery						
Any TTRM	37.5% vs. 35.6%	0.86	46.7% vs. 63.6%	0.24	87.5% vs. 75%	0.46
Pure TTRM	12.5% vs. 20.7%	0.36	26.7% vs. 13.6%	0.24	50% vs. 35%	0.46
Any FTRM	41.7% vs. 54%	0.28	20% vs. 20.5%	0.97	0 vs. 0	NA
Pure FTRM	4.2% vs. 2.3%	0.52	0 vs. 0	NA	0 vs. 0	NA
ETFTRM	79.2% vs. 89.7%	0.17	66.7% vs. 84.1%	0.14	87.5% vs. 75%	0.46

+ Responder would consider the relevant obesity treatment

*p values with a statistical significance are shown in bold

BMI: Body mass index, ETFTRM: Either thinner or fatter than reality misperception, FTRM: Fatter than reality misperception, NA: Not applicable, TTRM: Thinner than reality misperception, WM +: Weight misperception is present for the particular type, WM -: Weight misperception is absent for the particular type

4.DISCUSSION

This study showed that medical and surgical obesity treatment considerations are low among overweight and obese patients. Female and younger participants were more likely to consider medical and surgical treatments. Prior exercise history with the purpose of weight loss was shown to be associated with higher anti-obesity surgery consideration. Among patients with a BMI of 35 kg/m², patients with pure-TTRM were more likely to consider medical obesity treatment compared to those who do not have pure-TTRM. To the best of our knowledge, this is the first study in Turkey to evaluate overweight and obese patients' attitudes towards medical and surgical treatment of obesity and describe associated factors.

Non-pharmaceutical and non-surgical therapies, that is, lifestyle modification, dietary modification, and regular exercise, constitute the backbone of obesity treatment. Moreover, both patients and healthcare providers do not perceive medical and surgical treatments as desirable weight-loss options.¹⁰ However, long-term compliance with non-medical and non-surgical therapies is low, and patients tend to return to their baseline weight.²¹ This phenomenon is called "weight cycling", which is sequential weight loss and regain associated with adverse cardiometabolic results.²² Therefore, various guidelines regarding cardiometabolic diseases suggest medical and surgical obesity treatment options for patients who have failed non-interventional treatments.^{4,23} We demonstrated that less than one in three participants would consider anti-obesity medications or surgeries as an option for weight loss. These findings are in parallel with findings from an Asian study.¹⁰ Considering the fact that more than three-fourths of the participants have tried to lose weight before and more than 90% think that obesity is at least partially important, the figures for weight loss

medications and surgery are remarkably low. The gap between evidence-based medicine and daily clinical practice should be closed in order to avoid obesity related adverse outcomes.

Discrepancy between the perceived and measured weight is called weight misperception, and it has been shown to affect future weight loss, with the studies having conflicting results: While several studies indicate that weight misperception is associated with lower odds of weight loss^{18,24}, Sonnevile et al. demonstrated that weight misperception is associated with lower future weight gain. (25) Our main study cohort did not demonstrate a difference between weight misperception groups and anti-obesity medication or surgery consideration; however, when only patients with the highest BMI (i.e., BMI >35) were considered, patients who perceived them thinner than real both verbally and visually were more likely to consider anti-obesity surgery and medications. Although this consideration does not necessitate lower future weight loss, as demonstrated by Sonnevile et al., our finding seems to be in parallel with their findings.

We have found that female participants were significantly more likely to consider anti-obesity medications compared to male participants, and although there was no statistical significance, they also tend to consider anti-obesity surgery more than males. A survey conducted in Mauritius on female teenagers also demonstrated that weight-loss behaviors were more prevalent among female participants compared to males.²⁶ However, a study conducted in Saudi Arabia demonstrated that male participants were more likely to consider weight-loss surgery.⁹ These differences may reflect the impact of cultural differences on obesity treatment attitudes.

We acknowledge our study's limitations. Firstly, this study was conducted among patients

comprising highly educated people (61.1% have a college degree and above), which markedly differed from the education statistics of Turkey.²⁷ Secondly, we did not inform participants about the benefits and risks of anti-obesity medications and anti-obesity surgery; thus, some patients may be unaware of the real-world effectiveness of these modalities. Finally, the number of stage 3 obese individuals was low. Since they are the ones who are most likely to benefit from the anti-obesity treatments, their underrepresentation may have affected the results.

In conclusion, anti-obesity treatment consideration is low among participants who are candidates for treatment. Policymakers as well as clinicians should work together to increase awareness of obesity and its treatment modalities.

Author Contributions

ATG and MO conceptualized the study. ATG, MO, BK, NŞ, AÖ, and TIG designed the study. BK, NŞ, AÖ, and TIG collected data. ATG and MO performed the statistics. ATG, MO, BK, NŞ, AÖ, and TIG prepared the draft manuscript, ATG and MO prepared the final manuscript.

Conflict of interest

All authors declare no conflict of interest

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