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Obesity Medical Treatment: A Retrospective Analysis of Clinical Outcomes in Patients with Obesity in a Real-World Setting

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ABSTRACT: **Background**: Obesity is a chronic multifactorial disease characterized by excessive fat accumulation, influenced by genetic and environmental factors. It is associated with numerous health complications and significant reductions in life expectancy. Effective weight loss of at least 5% of total body weight (TBW) significantly reduces these risks. While lifestyle changes are pivotal, they often result in modest and difficult-to-maintain weight loss. Pharmacological treatments have emerged as effective strategies for achieving weight loss, yet data from real-world settings remain limited. **Objective:** This study aims to evaluate the effectiveness of pharmacological treatments for weight loss in real-world clinical practice. **Methods:** This observational, retrospective cohort study analyzes data from patients enrolled in a multidisciplinary obesity treatment program at a Portuguese public hospital, from July 2022 to November 2024. Inclusion criteria were age >18 years, body mass index (BMI) >25.0 kg/m², prior failed lifestyle interventions, and ≥3 months of pharmacological treatment (including semaglutide, liraglutide, bupropion/naltrexone and orlistat). For treatment goals we stablished a weight loss of ≥5% TBW at 6 months and ≥10% TBW at one year. Demographic, clinical, and treatment data were collected from medical records, and weight loss outcomes were assessed at three-month intervals. **Results:** Forty-three patients were included, with a mean age of 53±15 years and a mean BMI of 39.1±7 kg/m². After six months of treatment, 81% achieved the ≥5% TBW reduction target, with 45.9% surpassing ≥10% TBW. After one year, 54.5% lost ≥10% TBW, and 41% achieved ≥15% TBW reductions. Semaglutide users experienced the highest mean TBW loss (-10.8%). A total of 43% of patients were reclassified to a lower obesity class. Treatment goals were met by 81.1% of patients at 6 months and by 54.5% at 12 months. **Conclusions:** Pharmacological treatment, combined with lifestyle interventions, resulted in clinically significant and sustained weight loss in the majority of patients, highlighting its effectiveness in real-world clinical settings even amidst challenges like medication shortages and financial constraints. Further research is needed to optimize individualized treatment strategies and enhance long-term outcomes.

KEYWORDS: Obesity; Weight Loss; Pharmacological Treatment; Semaglutide; Liraglutide.

INTRODUCTION

Obesity is a chronic multifactorial disease characterized by the excessive accumulation of fat, resulting from a strong genetic predisposition and several environmental factors (diseases, drugs, stress, menopause, sleep deprivation, microbiome, viruses and toxins).[1-3]

It is associated with numerous health complications, impacting nearly every organ system. Activates the renin-angiotensin-aldosterone system, promotes insulin resistance, changes the lipidic metabolism and generates a pro-inflammatory state, contributing to conditions such as hypertension, type 2 diabetes, dyslipidemia, coronary heart disease, obstructive sleep apnea, hypoventilation syndrome and symptomatic degenerative osteoarthritis, and also raises the susceptibility and severity of infections and cancer.[4-6] This significantly increases morbidity and mortality, resulting in up to 10 years reduction in life expectancy.[7-8]

Prevalence has reached alarming levels, especially in developed countries. In Portugal, 68% adults are overweight and 29% obese.[5] The worldwide economic impact is huge, almost US$2 trillion in 2023[6]. Recent data shows, for the first time, a 2% reduction in obesity in the United States of America between 2020 and 2022.[7]

Weight losses of at least 5% of total body weight (TBW) have been shown to alleviate complications such as diabetes, hypertension, and cardiovascular disease, with larger losses producing even greater health benefits and further reducing these risks.[4-5,12-15]

Although lifestyle interventions (e.g., dietary changes and increased physical activity) are the cornerstone of treatment, they often lead to modest and difficult-to-maintain weight loss.[4-5,13-14] This is mainly because the body weight is regulated mainly in the brain, where physiological adaptations counteract changes, leading to stability. As a result, weight loss leads to a reduction in resting metabolism and hormonal changes affecting appetite and thyroid function.[12]

In recent years, pharmacological treatments have proven to be highly effective in achieving weight loss, though data outside clinical trial settings remains limited.[13–16]

The goal of this study is to evaluate the effectiveness of pharmacological treatments for weight loss in real-world clinical practice.

MATERIALS AND METHODS

Patients (inclusion and exclusion criteria)

This observational, retrospective cohort study uses a convenience sample of the first consecutive patients enrolled in a multidisciplinary medical obesity treatment program within the internal medicine department in a Portuguese public hospital. Data was obtained from the medical electronic health record (EHR), between july 2022 and november 2024.

Participants were required to meet the following inclusion criteria: age over 18 years old, BMI over 25.0kg/m^2, a history of unsuccessful attempts at lifestyle changes, and at least three consecutive months of pharmacological treatment aimed at weight loss. Data was collected from the medical electronic health record (EHR) for all eligible patients. The multidisciplinary team involved in the program included internal medicine doctors, dedicated nurses, nutritionists, physiatrists, physiotherapists, and psychologists. Weight loss outcomes were assessed every three months following treatment initiation.

Study design and treatment

Demographic data collected included sex, age, previous comorbidities, weight and BMI. The study assessed patient weight at the beginning and trimonthly during treatment. Weight loss was analyzed, including the mean weight loss of the population, BMI and mean BMI of the cohort, obesity classification and percentage of patients who achieved ≥5%, ≥10%, ≥15% and ≥20% losses of TBW.

Endpoints and measurements

Based on previous data, treatment goals were set to achieve a ≥5% TBW loss at 6 months and ≥10% TBW loss after 12 months.[2,8,12,14,15,17,18]

The primary endpoint was to evaluate the percentage of patients that achieve ≥5% TBW loss after 3 months of treatment and ≥10% TBW loss after 12 months. The secondary endpoint was to evaluate the safety of medical treatment of obesity.

Patients' obesity class category was monitored throughout treatment. According to the body mass index (BMI), obesity can be classified in: overweight (25-29.9kg/m^2), class I obesity (30-34.9kg/m^2), class II obesity (35-39.9kg/m^2) and class III obesity (≥40kg/m^2).[19] Any changes in the obesity class were analyzed.

According to response to treatment, patients were classified into three groups: **responders**, who sustained weight loss throughout the treatment period; **initial responders,** who achieved at least the first goal of ≥5% TBW loss at the beginning but experienced weight regain after a few months; and **nonresponders**, who did not lose weight or did not reach any goal despite treatment.

Data regarding adverse effects and intolerance to medication were collected. The treatment was adjusted as needed.

According to the program's protocol, treatment for comorbidities such as hypertension, dyslipidemia, diabetes and hypothyroidism was optimized. Regular blood samples were taken to monitor dyslipidemia, renal function, glucose and HbA1C and hepatic markers. Abdominal echography was performed at baseline to assess for liver disease such as nonalcoholic fatty liver disease (NAFLD) and choledocholitiasis. Several patients were previously followed by pneumology, psychiatry, gastroenterology, orthopedy and neurosurgery for pathologies as obstructive sleep apnea, depressive syndrome, NAFLD or symptomatic osteoarthritis; when appropriate, patients were referred to these specialties for evaluation or follow up. Throughout the program, chronic medications were reviewed, optimized, and when possible, medications known to promote weight gain were adjusted to maximize treatment outcomes.

Patients with type 2 diabetes (T2D) were preferentially prescribed semaglutide in a maximum dose of 1.0 mg weekly (the recommended dose for T2D) due to market shortages. Prescription of medication for the nondiabetic patients was preferentially liraglutide 3.0mg daily, as well as bupropion/naltrexone180/16mg twice daily preferred for smokers or alcohol abusers and orlistat for economic reasons, chosen by clinical criteria combined with patient preference.

Regarding lifestyle, patients were classified as sedentary if they spent more than half of the day without walking. Patients were referred to exercise sessions led by physiatrists and physiotherapists, and encouraged to start or intensify physical exercise according to their capacities. In collaboration with nutritionists, patients' dietary habits were assessed. Those with inadequate habits, such as excessive intake of carbohydrates and fats, were closely monitored to promote education on healthy eating. Patients who reported compulsive overeating or expressed a need for psychological support were referred to psychological consultations and, when necessary, to psychiatry.

Statistical analysis

All patients that fulfilled the inclusion criteria were included. Statistical analysis comprised calculation of means, standard deviations, medians, minimum and maximum values and frequency distributions. Data was presented as the percentage of patients meeting various treatment goals. Data collection and initial analysis were performed using Microsoft Excel.

Data analysis was performed using the STATA program version 14.0. Descriptive analysis was conducted.

Sign tests were utilized to assess paired variables before and after the initiation of medication, and Spearman's correlation coefficient was used to evaluate the relationship between results obtained during the follow-up period concerning blood glucose and weight.

RESULTS

Baseline characteristics of the study population

A total of 43 patients, followed in the multidisciplinary medical obesity treatment program, met the eligibility criteria.

They were mostly women (n=35, 81.4%) with a mean (± standard deviation (SD)) age of 53±15 years old. The mean (± SD) weight at first consultation was 105±20Kg, and mean (± SD) BMI was 39.1±7 Kg/m^2.

One third of the cohort had class III obesity (BMI ≥40 Kg/m^2) and 44% had class II obesity.

Dyslipidemia and arterial hypertension were the most common comorbidities (74% and 57%), however T2D and depression syndrome were also frequent (35% and 40%, respectively). Almost 90% of the population had inadequate diet, 72% had a sedentary lifestyle and 44% referred binge eating. Demographic and clinical characteristics of the study population are summarized in Table 1.

Body weight and BMI

Table 2 presents data on patient under treatment at each stage and corresponding weight loss goals over a 21-month treatment period. During the time of the study, 43 patients were enrolled (100%). Over time, there was a gradual decline in the number of patients that reached the different trimonthly observation stage due to different follow-up time.

Detailed information on individual weight loss throughout the treatment period is provided in Figure 1, each line showing the weight evolution of one patient over time. Not all patients responded with consistent

TABLE 1. Demographic and clinical characteristics, obesity class I.

Demographic and clinical characteristics	
Number of patients, n	43
Sex, n (%)	
Women	35 (81.4%)
Men	8 (18.6%)
Age, mean ± SD (minimum, maximum) | median (Q1 – Q3), years	53±15 (22, 79) | 54 (42 – 63)
Weight measurements	
Weight, mean ± SD (minimum, maximum) | median (Q1 – Q3), Kg	105±20 (69, 148) | 102 (91 – 122)
BMI, mean ± SD (minimum, maximum) | median (Q1 – Q3), Kg/m^2	39,1±7 (25.6, 59.3) | 38 (35.4 – 42.75)
Obesity class III, n (%)	14 (33%)
Obesity class II, n (%)	19 (44%)
Obesity class I, n (%)	8 (18.7%)
Excessive weight, n (%)	2 (4.7%)
Overweight since infancy	25 (58%)
Comorbidities n, %	
Dyslipidemia	32 (74%)
Arterial hypertension	24 (57%)
Depressive syndrome	17 (40%)
Type 2 diabetes	15 (35%)
Symptomatic osteoarthrosis	14 (32%)
Osbtructive sleep apnea	11 (26%)
Nonalcoholic fatty liver disease	10 (23%)
Lifestyle, n (%)	
Inadequate diet	38 (88%)
Sedentarism	31 (72%)
Binge eating	19 (44%)
Taking weight promoting medication	8 (19%)

LEGEND – **BMI:** body mass index; **n:** number of patients; **SD:** standard deviation; **Q1:** Quartile 1; **Q3:** Quartile 3.

weight loss: 22 (51%) responders (weight loss consistent through treatment); 12 (27.9%) initial responders but regained weight, and 9 (20.9%) nonresponders (no goal met or weight loss was observed).

At 3 months of treatment, nearly half (46.5%, n=20) of the population reduced their TBW by more than 5%. As expected, the mean BMI at this stage decreased as well from 39.1 kg/m^2 to 37.19 kg/m^2 (-1.91Kg/m^2) – Table 2.

At 6 months of treatment the primary goal (≥5% TBW loss) was attained by 81% of all patients (n=30), and 45.9% (n=17) exceeded this goal, achieving losses above 10% TBW. The overall mean weight losses was 10.22Kg, corresponding to a mean loss of 9.7% TBW. At this point, 16 patients (43.2%) were down reclassified in their class of obesity.

At one year follow-up, the treatment revealed the same tendency with the majority of this population

TABLE 2. Body weight changes during treatment.

Body weight change during treatment							
Body weight and BMI measures	**Time of treatment, months (m) | n= patients at time of treatment (%)**						
	3 m | n=43 (100%)	6 m | n=37 (86%)	9 m | n=28 (65%)	12 m | n=22 (51%)	15 m | n=12 (28%)	18 m | n=7 (16%)	21 m | n=4 (9%)
Predefined ΔTBW goal	≥ 5 %	≥ 5 %	≥ 10 %	≥ 10 %	≥ 10 %	≥ 10 %	≥ 10 %
Percentage body weight reduction, n (%)							
At least ≥ 5 % TBW	20 (46.5)	30 (81.1)	22 (78.6)	18 (81.8)	8 (66.7)	5 (71.4)	3 (75.0)
At least ≥ 10 % TBW	5 (11.6)	17 (45.9)	15 (53.6)	12 (54.5)	7 (58.3)	3 (42.9)	2 (50.0)
At least ≥ 15 % TBW	1 (2.3)	7 (18.9)	9 (32.1)	9 (40.9)	5 (41.7)	2 (25.0)	2 (50.0)
At least ≥ 20 % TBW	0 (0)	2 (5.4)	1 (3.6)	1 (3.6)	3 (25.0)	1 (12.5)	1 (20.0)
Mean ΔTBW (%)	-4.9	-9.7	-11.1	-11.2	-11.7	-9.9	-11.8
Body weight							
Mean (Kg)	100.2	96.9	96.3	94.3	94.5	91.6	92.0
standard deviation (Kg)	19.84	20.07	20.78	16.60	17.70	14.65	19.70
mean loss (Kg)	-5.2	-10.2	-11.9	-12.3	-12.8	-9.9	-11.9
BMI (kg/m^2)							
Minimum	25.8	26.9	24.2	24.7	24.7	33.2	25.6
Maximum	60.1	50.3	61.7	45.8	41.3	40.9	40.8
Mean	37.2	37.0	36.0	35.3	34.9	36.7	34.8
Standard deviation	6.7	5.4	7.8	5.7	5.6	3.8	7.2
Obesity class, n (%)							
Excessive weight	3 (7)	6 (16.2)	6 (21.4)	5 (22.7)	2 (16.7)	1 (14.3)	1 (25.0)
Class I	18 (41.9)	13(35.1)	6 (21.4)	5 (22.7)	4 (33.3)	3 (42.9)	1 (25.0)
Class II	11 (25.6)	9 (24.3)	8 (28.6)	7 (31.8)	2 (16.7)	1 (14.3)	0 (0.0)
Class III	11 (25.6)	9 (24.3)	8 (28.6)	5 (22.7)	4 (33.3)	2 (28.6)	2 (50.0)
Patients reducing class, n (%)	15 (34.9)	16 (43.2)	13 (46.4)	10 (45.5)	5 (41.7)	4 (57.1)	1 (25.0)

LEGEND – **Excessive weight:** BMI 25.0-29.9 Kg/m^2; **Obesity Class I:** BMI of 30.0-34.9kg/m^2; **Class II:** BMI of 35.0-39.9 Kg/m^2 and **Class III:** BMI >40.0 Kg/m^2. **QI:** first quartile; **ΔTBW:** variation of total body weight; **BMI:** body mass index; **n:** number.

(81.8%) losing at least 5% TBW, more than half (n= 12, 54.5%) achieved more than 10% TBW loss and 41% (n=9) losing more than 15% TBW. The mean loss of weight at this stage of treatment was 12,33Kg and the mean ΔTBW was -11% surpassing the general goal stablished for this stage.

Through time, the declining sample size due to different follow up period preclude more robust interpretation, however between 15 and 21 months the mean body weight reduction varies between 10 and 12% TBW. Figure 2 represents the percentage of patients that attained various levels of weight loss (as a percentage of total body weight, TBW) over the course of treatment. During treatment, the percentage of patients that had lost at least 5% TBW is superior to 70% after 6 months. The loss of 10% TBW increases after 6 months treatment with more than 40% of the cohort reaching the goal of treatment.

The tendency of weight loss is present even after more than one year of treatment (Figure 2 and 3). While the most significant weight loss occurred in the initial months, statistical reductions in weight persisted even after 12 months. Some patients showed either weight regain or stabilization in their weight loss trajectory, as detailed in Figure 1 and 2.

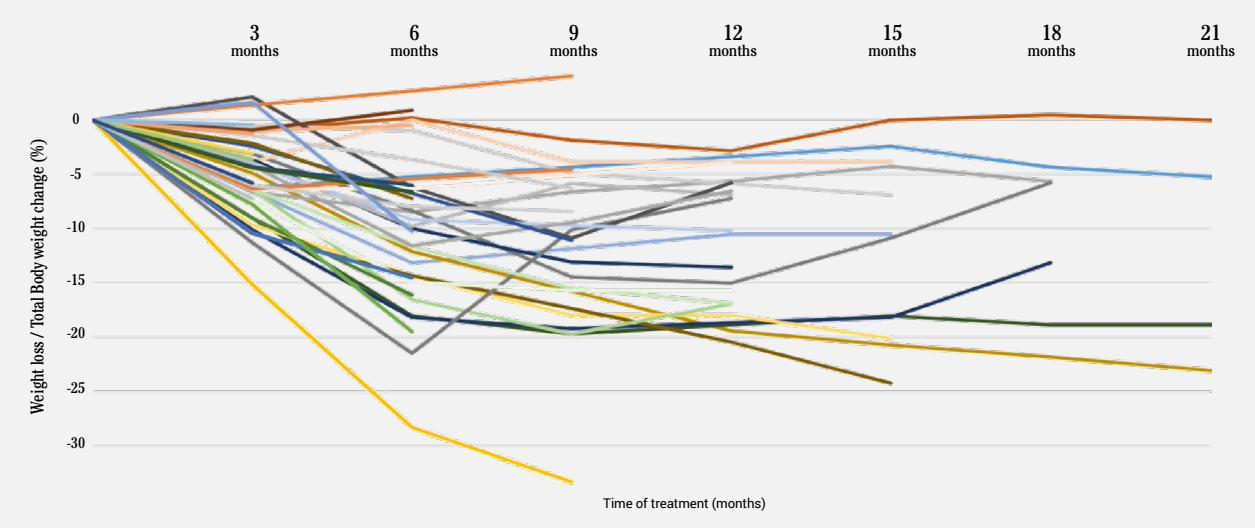

FIGURE 1. Individual weight loss during treatment

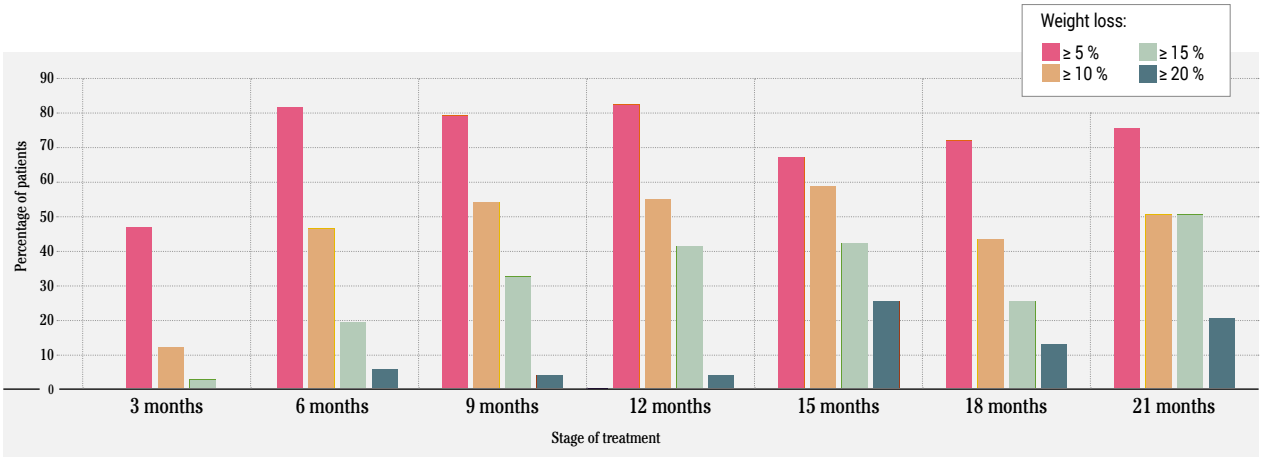

FIGURE 2. Weight loss during treatment.

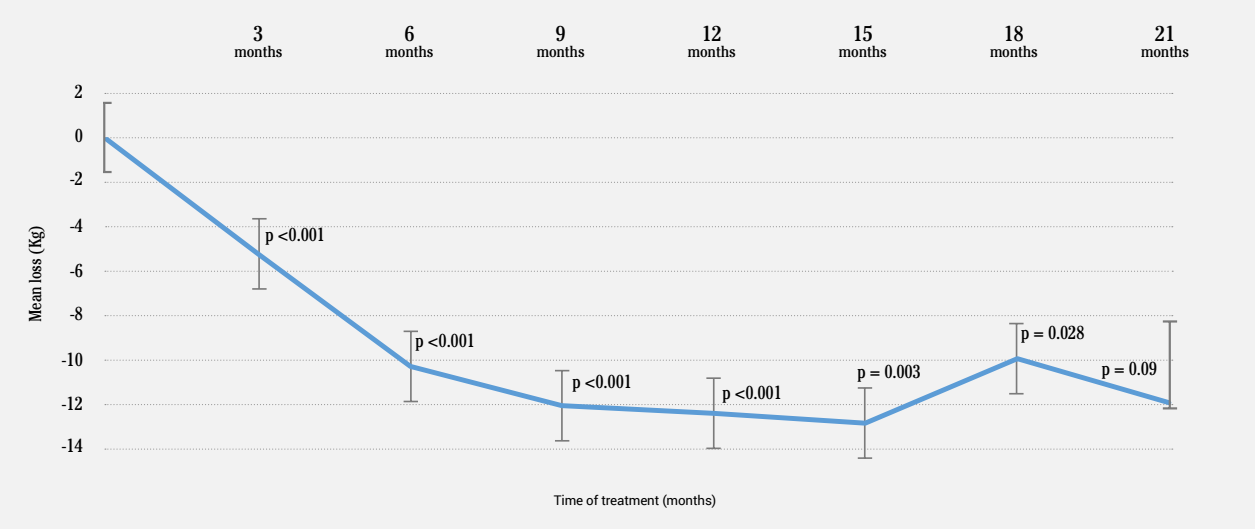

FIGURE 3. Mean weight loss of patients on medical treatment for obesity.

Medication used during treatment

Table 3 describes the different drugs used in the program, their outcomes, adverse effects and motive for drug alteration. For analysis purposes, when one patient tried more than one drug, we considered the one used for the longest time. None of the patients was under more than one drug at the same time. The majority of the patients (n=29, 67.4%) were treated with semaglutide, liraglutide was the second most used medication (n=11, 25.6%) and only 3 patients (6.9%) were treated with bupropion/naltrexone.

Patients treated with semaglutide had better results of weight loss with a mean loss of 10.8% TBW over 21 month. The population under liraglutide had a mean loss of 4.2% TBW. The few patients under buproprion/naltrexone achieved a mean loss of 7.4% TBW. Orlistat was only used for short periods in 2 patients under other drugs the majority of time. (Table 3)

During treatment, 13 patients changed medication: due to market shortages (the most common reason (n= 6, 13.9%)); 3 patients (6.9%) due to poor results; gastrointestinal intolerance to liraglutide (n=1, 2.3%); 1 patient (2.3%) interrupted treatment because of a new diagnose of neuroendocrine tumor and another for a planned pregnancy; 2 patients (4.7%) stopped medication altogether for economical insufficiency. The

TABLE 3. Analysis of drugs used during patients treatment.

Treatment	Semaglutide	Liraglutide	Bupropion/naltrexone	Orlistat
N prescribed drug	30	17	3	2
Main used drug during treatment, n (%)	29 (67.4)	11 (25.6)	3 (6.9)	0
Weight Δ, mean ± SD (minimum, maximum), Kg	-11.8 ± 9.3 (-33, +2.3)	-4.4 ± 4,76 (-11.7, +6.0)	-6.2 ± 2.0 (-8.4, -4.5)	0.5 ± 2.12 (-1.0, +2.0)
		Weight Δ, Kg		
Mean mean ± SD, Kg	-11.8 ± 9.3	-4.1 ± 5.5	-6.2 ± 2.0	0
Minimum, maximum, Kg	-33.0, +2.0	-11.7, +6.0	-8.4, -4.5	0
Median (Q1, Q3), Kg	-8.0 (-19.7, -5.2)	-3.2 (-10.2, -0.5)	-5.8 (-8.4, -5)	0
		ΔTBW, %		
Mean mean ± SD, %	-10.9 ± 8.1	-4.2 ± 5.0	-7.4 ± 0.9	0 (0)
Minimum, maximum, %	-33.0, +1.9	-11.1, +4.1	-8.4, -6.5	0 (0)
Median (Q1, Q3), %	-7.2 (-17.4, -5.6)	-3.6 (-10.3, -0.4)	-7.3 (-8.4, -7)	0 (0)
Loss ≥ 5 % TBW, n (%)	24 (82.8)	4 (36.4)	2 (66.7)	0 (0)
Loss ≥ 10 % TBW, n (%)	14 (48.3)	3 (27.3)	0 (0)	0 (0)
Loss ≥ 15 % TBW, n (%)	10 (34.5)	0 (0)	0 (0)	0 (0)
Loss ≥ 20 % TBW, n (%)	3 (10.3)	0 (0)	0 (0)	0 (0)
		Reported adverse effects, n (%)		
Nausea and vomiting	5 (11.6)	3 (6.9)	0 (0)	0 (0)
Constipation	1 (2.3)	0 (0)	0 (0)	0 (0)
Malaise	0 (0)	1 (2.3)	0 (0)	0 (0)
Steatorrhea	0 (0)	0 (0)	0 (0)	1 (2.3)
		Motive of suspension/drug alteration, n (%)		
Intolerance	0 (0)	1 (2.3)	0 (0)	0 (0)
No response	2 (4.7)	1 (2.3)	0 (0)	0 (0)
Contraindication by new diagnose	1 (2.3)	0 (0)	0 (0)	0 (0)
Planned pregnancy	1 (2.3)	0 (0)	0 (0)	0 (0)
Market shortage	6 (13.9)	2 (4.7)	0 (0)	0 (0)
Economic insufficiency	0 (0)	2 (4.7)	0 (0)	0 (0)

LEGEND – **Δ:** variation; **QI:** first quartile; **Q3:** third quartile; **n:** number; **SD:** standard deviation

adverse effects reported were mainly gastrointestinal, namely mild nausea and vomiting attributed to semaglutide (n=5, 11.6%) and liraglutide (n=3, 6.9%); mild malaise was reported by 1 patient and another had steatorrhea due to orlistat.

DISCUSSION

Our study provides real-world data from an obesity outpatient clinic in Portugal. To the best of our knowledge, this is the first published evidence in a Portuguese population. The results demonstrate positive outcomes in weight loss, with patients surpassing the 6-month target for total body weight (TBW) reduction.

In this cohort treated with weight-loss medications — semaglutide, liraglutide, bupropion/naltrexone and orlistat — the predefined TBW reduction goals were consistently achieved throughout the treatment stages. At 6 months, the majority of patients exceeded the -10% TBW target typically set for 9 months, and by one year, the average weight loss corresponded to an 11% reduction in TBW continuing to accomplish the proposed goals. Remarkably, 41% of patients surpassed weight-loss goals, achieving reductions of 15% to 20% in TBW.

Although weight loss fluctuated during the treatment period, more than half of the patients sustained a reduction of over 10% in TBW above one year follow up. These results underscore that, even in real-world settings, combining pharmacological treatments with lifestyle modifications can lead to significant and lasting weight loss.

Data denoted different patterns of response. Most patients (51%) were classified as responders, achieving sustained weight loss during treatment. Some patients (27.9%) lost weight only at the beginning (initial responders), while others (20.9%) did not lose significant weight (nonresponders). It would have been important to recognize the treatment response early and, if necessary, change the type of medication used and control external modifiable factors. Given the retrospective design and missing data, it was not possible to identify specific characteristics of patients in each group, limiting our ability to draw conclusions that could help predict outcomes earlier. Additionally, some patients were still in the 3-month stage of treatment and might later become initial responders, which could introduce a potential bias in this analysis.

The most used drug in our study was semaglutide (n=30, 69.8%). Patients treated with it lost an average of 10.8% of their total body weight (TBW), similar to the -10.6% TBW loss reported at 20 weeks in the STEP 4 trial for semaglutide 2.4 mg weekly.[8,20] However, as expected since our study concerns a small size population with the real-world setbacks, our results were lower than the -17.4% TBW loss seen at 68 weeks in STEP 4.

In our study, 83.3% (n=25) of patients lost at least 5% TBW, compared to 88.7% in STEP 4. Additionally, 46.7% (n=14) lost at least 10% TBW, while 79.0% in STEP 4 and 70.9% in STEP 8 achieved this goal. For higher weight-loss targets, 33.3% (n=10) lost at least 15% TBW, compared to 63.7% in STEP 4 and 55.6% in STEP 8, while only 10% (n=3) lost at least 20% TBW, compared to 39.6% in STEP 4 and 38.5% in STEP 8.[8,13,20]

The lower results in our study may be explained by the lower semaglutide dose used (1.0 mg weekly). STEP 2 showed better outcomes with higher doses (2.4 mg weekly), with TBW losses of 9.6% compared to 7.0% for 1.0 mg.[8,19] Other factors that may have influenced our findings include varying treatment durations among patients, the inclusion of diabetic patients in our study (unlike STEP 4), and the need to switch medications for 13 patients due to earlier-mentioned reasons.

Liraglutide was used by a quarter of the patients (n=11), who lost an average of 4.8% TBW. This is lower than the weight loss reported in the SCALE IBT trial (-7.5% at 15 months) and STEP 8 (-6.4% at 15 months).[13,17,21] In our study, 36.4% (n=4) achieved ≥5% TBW loss compared to 61.5% in SCALE IBT, while 27.3% (n=3) achieved ≥10% TBW loss compared to 30.5% in SCALE IBT and 25.6% in STEP 8. None of our patients achieved ≥15% TBW loss, whereas 18.1% in SCALE IBT and 12.0% in STEP 8 did.[8,13,20] Despite these lower results, and considering the small sample size and the non-randomized nature of our study, 4 patients showed consistent weight loss throughout the treatment, supporting liraglutide is an option for patients that are not candidates for treatment with semaglutide.

The differences in weight loss outcomes in this study may be partly due to including patients at different treatment stages and changes or interruptions in medication, which could have introduced bias. During treatment, one patient had a new diagnose of a neuroendocrine tumor and all data available suggests the tumor origin was completely independent from the obesity treatment and another one was planning a pregnancy, both reasons contraindicated the continuation of the treatment. Only mild adverse reactions were reported

by patients (mainly gastrointestinal), which is consistent with the results in the previously mentioned trials.[13,17,20,22] Despite these challenges, the results show a general trend of TBW loss over time. Overall, our findings demonstrate significant weight loss and suggest that, even with medication limitations and real-world challenges, patients can achieve meaningful reductions in body weight.

During the study, tirzepatide was not available in Portugal and therefore was not used in the program. However, trials show that tirzepatide leads to greater weight loss compared to semaglutide. In the SURMOUNT trial, 85% and 91% of patients lost ≥5% TBW with 5 mg and 15 mg doses, respectively, at 72 weeks, while 50% (5 mg) and 57% (10 mg and 15 mg) lost ≥20% TBW.[15] These promising results suggest that the program's outcomes could improve significantly now that tirzepatide is available in Portugal.

Strengths and limitations

This study has several strengths, including its real-world setting, which reflects the challenges and barriers patients face outside of controlled clinical trials. The long-term data presented here provide insight into the sustainability of weight loss over time. However, there are notable limitations. The sample size is small, as the study only includes patients from a single hospital in Lisbon, where the multidisciplinary medical obesity treatment program was still in its early stages and not widely replicated. This limits the generalizability of our findings.

Additionally, we were unable to track the exact duration of treatment interruptions due to market shortages of GLP-1 medications, which may have introduced bias in the analysis. Some patients also discontinued treatment or switched medications due to intolerance, responsiveness, clinical reasons or patient preferences, including financial constraints, further complicating the interpretation of long-term outcomes. Another limitation is that we focused primarily on the medical treatment, and did not quantify the effects of lifestyle changes, such as diet and exercise, which undoubtedly played a role in weight loss alongside the pharmacological interventions.

CONCLUSIONS

Pharmacological treatment, combined with lifestyle interventions, resulted in significant and sustained weight loss, highlighting its effectiveness in real-world clinical settings even amidst challenges like medication shortages and financial constraints. Further research is worthwhile to better tailor treatment and improve results.

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CONFLICT OF INTEREST STATEMENT: *Miguel Ardérius holds stock market shares in the following companies: Amgen, Bayer AG, BioNTech SE, Eli Lilly, GE Healthcare Technology, Gilead Sciences, GSK, Merck, Moderna, Novartis AG, Pfizer, Teladoc; Mariana Alves has participated in educational meetings and/or attended a conferences or symposia (including travel, accommodation and/or hospitality) with Boehringer-Ingelheim, AstraZeneca, Bayer, Bristol-Myers-Squibb, Grünenthal, Tecnimede, Merck Sharp & Dohme.*

ETHICS: *Confidentiality of Data: The authors declare that they have followed the protocols of their work center on the publication of data from patients.*

PROTECTION OF HUMAN AND ANIMAL SUBJECTS: *The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki as revised in 2013).*

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