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CARACTERIZAÇÃO DE UM PROGRAMA COMERCIAL DE GESTÃO DE PESO EM GINÁSIOS EXCLUSIVAMENTE FEMININOS EM PORTUGAL

CHARACTERIZATION OF A WOMEN-ONLY GYM'S COMMERCIAL WEIGHT MANAGEMENT PROGRAM IN PORTUGAL

CARACTERIZACIÓN DE UN PROGRAMA COMERCIAL DE GESTIÓN DE PESO EN GIMNASIOS EXCLUSIVOS PARA MUJERES EN PORTUGAL

Rui Jorge^{1,2}  <https://orcid.org/0000-0002-5261-2688>

Inês Santos³  <https://orcid.org/0000-0002-1638-8551>

Vitor Teixeira⁴  <https://orcid.org/0000-0002-9286-4716>

Pedro Teixeira³  <https://orcid.org/0000-0001-7202-0527>

¹ Universidade de Leiria e Oeste, Leiria, Portugal

² ciTechcare – Center for Innovative Care and Health Technology, Leiria, Portugal

³ Universidade de Lisboa, Lisboa, Portugal

⁴ Universidade do Porto, Porto, Portugal

Rui Jorge – rui.jorge@ipleiria.pt | Inês Santos - santosi@medicina.ulisboa.pt | Vitor Teixeira - vhugoteixeira@fcna.up.pt |

Pedro Teixeira - pteixeira@fmh.ulisboa.pt



Corresponding Author:

Rui Jorge

Campus 2 – Morro do Lena

2411 - 901 – Leiria - Portugal

rui.jorge@ipleiria.pt

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RESUMO

Introdução: Os programas comerciais de gestão de peso são uma opção válida para as mulheres que procuram perder peso.

Objetivo: Avaliar o impacto de um programa comercial de gestão de peso exclusivo para mulheres no peso corporal e analisar esse impacto segundo categorias de índice de massa corporal.

Métodos: Durante 30 meses, 689 mulheres iniciaram o programa. O programa consiste em aulas de grupo de exercício, consultas de nutrição e acompanhamento online. Foram recolhidos dados antropométricos, de saúde e hábitos alimentares.

Resultados: As participantes tinham uma idade média de $40,2 \pm 13,2$ anos e um índice de massa corporal de $27,5 \pm 4,9$ kg/m² (40,4% com pré-obesidade e 25,4% com obesidade). Cerca de 55% das participantes aderiram ao programa por pelo menos 6 meses, perdendo $-2,61 \pm 4,34\%$ e $-4,05 \pm 4,54\%$ do peso inicial, respetivamente, mulheres com pré-obesidade e obesidade. A alteração percentual do peso ao longo do programa diferiu segundo a categoria inicial de índice de massa corporal, com maiores reduções percentuais observadas nas participantes com obesidade.

Conclusão: Os resultados sugerem que programas comerciais de gestão do peso em ginásios dirigidos a mulheres podem constituir uma estratégia eficaz e exequível para apoiar a redução ponderal em contexto real. A sua implementação poderá representar uma opção relevante para mulheres portuguesas com excesso de peso que procuram perder peso através de alterações do estilo de vida.

Palavras-chave: programas de redução do peso; perda de peso; centros de fitness; mulheres

ABSTRACT

Introduction: Commercial weight management programs are a valid option for women seeking weight loss.

Objective: To evaluate the impact of a women-only commercial weight management program on body weight and to assess this impact according to body mass index categories.

Methods: During 30-months, 689 women started the program. The program consists of exercise group classes, nutrition consultations, and online follow-up. Anthropometric, health, and food habits data were collected.

Results: Participants were 40.2 ± 13.2 years old and had a body mass index of 27.5 ± 4.9 kg/m² (40.4% with pre-obesity and 25.4% with obesity). About 55% of participants adhered to the program at least 6 months, losing $-2.61 \pm 4.34\%$ and $-4.05 \pm 4.54\%$ of the initial weight, respectively, among women with pre-obesity and obesity. The percentage change in body weight throughout the programme differed according to the initial body mass index category, with greater percentage reductions observed among participants with obesity.

Conclusion: The findings suggest that commercial weight management programmes delivered in fitness centres and targeted at women may represent an effective and feasible strategy to support weight loss in real-world settings. Their implementation could provide a valuable option for Portuguese women with excess weight seeking to lose weight through lifestyle modifications.

Keywords: weight reduction programs; weight loss; fitness centers; women

RESUMEN

Introducción: Los programas comerciales de gestión de peso son una opción válida para las mujeres que buscan perder peso.

Objetivo: Evaluar el impacto de un programa comercial de control del peso dirigido exclusivamente a mujeres sobre el peso corporal y analizar dicho impacto según las categorías de índice de masa corporal.

Métodos: Durante 30 meses, 689 mujeres iniciaron el programa. El programa consiste en clases grupales de ejercicio, consultas de nutrición y seguimiento en línea. Se recogieron datos antropométricos, de salud y hábitos alimenticios.

Resultados: Las participantes tenían una edad media de $40,2 \pm 13,2$ años y un índice de masa corporal de $27,5 \pm 4,9$ kg/m² (40,4% con preobesidad y 25,4% con obesidad). Aproximadamente el 55% de las participantes se adhirieron al programa durante al menos 6 meses, perdiendo $-2,61 \pm 4,34\%$ y $-4,05 \pm 4,54\%$ del peso inicial, respectivamente, mujeres con pre-obesidad y obesidad. El cambio porcentual del peso corporal a lo largo del programa difirió según la categoría inicial de índice de masa corporal, observándose mayores reducciones porcentuales en las participantes con obesidad.

Conclusión: Los resultados sugieren que los programas comerciales de control del peso desarrollados en gimnasios y dirigidos a mujeres pueden constituir una estrategia eficaz y viable para favorecer la pérdida de peso en condiciones reales. Su implementación podría representar una opción relevante para las mujeres portuguesas con exceso de peso que buscan perder peso mediante cambios en el estilo de vida.

Palabras clave: programas de reducción de peso; pérdida de peso; centros de fitness; mujeres

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INTRODUCTION

Sustained weight management remains a major challenge in obesity care, as obesity is now widely recognized as a chronic, multifactorial, and relapsing condition (Busetto et al., 2024). Although dietary change and increased physical activity are fundamental for inducing weight loss (Lanoy et al., 2021), long-term maintenance is often difficult, and weight regain is common after the initial reduction in body weight; this has made long-term weight management a priority within both clinical and community-based obesity interventions (Busetto et al., 2024).

The difficulty in maintaining weight loss is explained not only by behavioral factors, but also by physiological adaptations that occur after weight reduction (Yanovski & Yanovski, 2024). The weight-reduced state is associated with changes in appetite regulation, energy expenditure, and reward-related responses to food, which may increase hunger, reduce satiety, and favor weight regain over time. In addition, environmental, psychological, and social factors can further compromise adherence to lifestyle changes, reinforcing the need for interventions that go beyond short-term advice and support continued engagement (Flanagan et al., 2023; van Baak & Mariman, 2025).

For this reason, multicomponent interventions that combine dietary counseling, physical activity, behavioral strategies, and ongoing follow-up are considered particularly relevant for weight management (Laudenslager et al., 2021; Yanovski & Yanovski, 2024). These approaches are better aligned with the complex determinants of obesity and may improve both initial weight loss and longer-term maintenance (Flanagan et al., 2023; Varkevisser et al., 2019). Recent evidence also suggests that interventions including active maintenance phases, self-monitoring, individualized feedback, and remote or online support can enhance scalability while helping to reduce weight regain over time (Hendrie et al., 2025; May et al., 2023; Tate et al., 2022).

Gyms are often sought for weight management purposes, and in Portugal both men and women report using physical activity as a weight management strategy (Jorge et al., 2020). Women-only gyms emerged in the United States in the early 90s and have since expanded internationally, including in Portugal, since the early 00s, representing a particularly relevant setting for structured lifestyle interventions, especially because these facilities frequently integrate exercise support with nutrition professionals and regular contact with members (AGAP, 2023; International Health, Racquet & Sportsclub Association, 2023).

Tailored weight management interventions can be advantageous in the long term (Varkevisser et al., 2019), and the private sector has increasingly sought to develop cost-effective programs capable of combining accessibility with individualized support. Some commercial interventions have shown promising results for weight loss and weight maintenance, particularly when they include digital tools and continued behavioral follow-up (Benavides et al., 2021; Buckland et al., 2018; Hendrie et al., 2025; Laudenslager et al., 2021; May et al., 2023; Tate et al., 2022). However, published evidence on women-only commercial weight management programs remains limited, and this represents an important gap, given that large numbers of women attend gyms regularly and may be reached through structured programs integrating exercise, nutrition, and ongoing monitoring.

Therefore, the primary objective of this study is to evaluate the impact of a nationally relevant commercial weight management program (VivafitResults®) delivered in Portuguese women-only gyms and combining exercise, nutrition, and weekly customized online follow-up, on body weight. The secondary objectives are to assess the impact of the program on body weight according to BMI categories.

1. METHODS

1.1 Participants

Between August 2011 and February 2014 (30 months), 689 women, members of 5 women-only gyms in the region of Lisbon (Portugal), started VivafitResults® program. Participants were recruited before the first nutrition appointment of the program, and no compensation to participate in the study was granted.

Admission criteria were: age ≥ 18 years and reporting the goal of losing weight.

Exclusion criteria: being pregnant, psychiatric disease diagnosed and previous bariatric surgery.

1.2 Procedures

The program started by completing an online questionnaire to support the first nutrition appointment. The questionnaire included 5 questions on socio-demographic data, 17 questions about participants' clinical history, and 56 questions related to participants' eating and other lifestyle habits.

Semi-annually, during the nutrition appointment, weight was assessed always respecting the same conditions – before exercising, at the same time of the day, barefoot and with light clothing, in a BC 532 Tanita® scale (precision ± 0.1 kg and capacity 150kg) and a mean value of 2 weighings were calculated. Height was self-reported during the first nutrition appointment and considered a valid method since, in a nationally representative sample of Portuguese women, the mean height overestimation was just 0.3 cm, independently of their age, education level and body mass index (BMI) (Giesteira, 2023). Based on these variables, BMI and the magnitude of weight change were calculated; negative weight-change values indicated weight loss, whereas positive values indicated weight gain.

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Waist circumference was assessed using the horizontal plane, parallel to the floor, located at the closest point of the right iliac crest (Ross et al., 2020).

All procedures of this study were performed respecting the ethical standards defined in the 1964 Helsinki's declaration and its subsequent amendments, as well as the ethics committee of the BLINDED IRB TO ASSURE NO IDENTIFYING INFORMATION. Before starting the study, all participants read and signed a written informed consent.

1.3 Program description

The program had three main components: physical exercise, nutrition, and personalized online coaching.

All participants had unlimited access to physical exercise, mainly through scheduled group classes such as BodyBalance®, BodyVive®, Pilates, and Zumba, which could be performed during the opening hours of the gyms (8 AM to 9 PM). Personal training was also available as an additional paid service.

Every 6 months, participants had a 30-minute appointment with a registered dietitian. The same registered dietitian interacted with all participants throughout the program. During these appointments, anthropometric assessment was performed, including weight, waist circumference, and BMI, and an individualized food plan was prescribed. The food plan was tailored according to participants' weight-loss goals, food preferences, physical activity level, comorbidities, and specific nutritional needs. Energy requirements were usually estimated by calculating basal metabolic rate using the Harris–Benedict equation and then multiplying this value by the physical activity factor considered most appropriate for each participant. The prescribed food plan was generally based on an energy deficit of approximately 500 kcal/day. As a standard approach, the macronutrient distribution was approximately 50% carbohydrate, 30% fat, and 20% protein. The dietary structure usually consisted of a meal pattern distributed across six daily eating occasions and was broadly aligned with a Mediterranean-style dietary pattern. During the nutrition appointments, participants were actively involved in the decision-making process leading to the development of the tailored food plan. Extra appointments between the 6-month consultations scheduled were available as an additional paid service.

Personalized online coaching consisted of a digital platform, available as a mobile app and website, where participants had access to the following functionalities:

- A private and confidential message center through which participants could contact the registered dietitian at any time between appointments.
- Access to the tailored food plan, food diary templates, exercise self-monitoring tools, and the main conclusions and statistics from the eating and lifestyle habits analysis.
- Access to anthropometric data collected during appointments and the possibility of adding extra self-reported anthropometric data, encouraging self-monitoring of weight and waist circumference through automatically generated graphs.
- Energy expenditure calculators based on the Metabolic Equivalent of Task (Herrmann et al., 2024) for different physical activities.
- Personalized cell phone or computer reminders for meals or water intake.
- Weekly “personalized” messages based on the individual profile of each participant.

At each follow-up appointment, the registered dietitian had access to the information recorded through the digital platform, including food diaries, weekly messages, anthropometric self-monitoring data, and messages exchanged through the message center. This information was used to support dietary monitoring, reinforce behavioral strategies, and adjust the food plan when needed. Every 6 months, the same questionnaire was completed again to support the nutrition appointment and to determine the following 6 months of personalized messages.

The individual behavioral profiles were generated from 33 questionnaire items related to eating habits, lifestyle, behavioral barriers, and psychosocial aspects of weight management. Each item was answered on a 4-point Likert scale, where 1 meant “I am not like that”, 2 “Sometimes I am like that”, 3 “I am almost always like that”, and 4 “I am definitely like that”. These items were linked to 14 possible behavioral profiles. Seven profiles were mainly related to eating patterns: “I skip meals and do not have time to eat”, “I mostly eat in the evening”, “I mostly eat take-away or in restaurants”, “I am always snacking”, “I do not eat enough fruits and vegetables”, “I eat too much at the main meals”, and “when I am with somebody, my diet is perfect, but when I am alone, I have an unhealthy diet”. The remaining seven profiles were mainly related to behavioral and stress-management patterns: “I eat because of my emotions”, “I am always on the run”, “I am always procrastinating”, “I want to please everyone around me”, “Diets do not work for me”, “I am not happy with my body, and it lowers my self-esteem”, and “My expectations are too high”. Some of these items were adapted from, or conceptually aligned with, previously validated Portuguese instruments or constructs. These included emotional eating and external eating items based on the Portuguese validation of the Dutch Eating Behaviour Questionnaire (Viana & Sinde, 2003), eating self-efficacy items conceptually aligned with the actual Portuguese Food Self-Efficacy Scale (Poinhos et al., 2013), self-esteem and body-image-related items conceptually aligned with constructs assessed by the Rosenberg Self-Esteem Scale and the Cooper Body Shape Questionnaire, including Portuguese versions or adaptations (Antunes & Palmeira, 2003; Cooper et al., 1987; Rosenberg, 1965; Vieira et al., 2004), and dietary restraint items conceptually aligned with the Portuguese version of the Restraint Scale (Carvalho et al., 2016). Other items were developed specifically for the commercial

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program to capture practical eating and lifestyle patterns relevant to weight management, such as meal skipping, evening eating, frequent consumption of ready-to-eat meals, frequent snacking, low fruit and vegetable intake, and large portion sizes.

For each profile, the responses to the corresponding predefined items were converted into a standardized score ranging from 0 to 100, with higher scores indicating greater relevance of that profile for the participant. Since each profile includes two or three items, the profile score was calculated from the mean of the corresponding items' responses after standardization. Thus, participants could present different degrees of relevance across several profiles, rather than being assigned exclusively to a single category. The profile scores were then used by the digital platform to identify the most relevant behavioral targets and to personalize the weekly messages and tasks delivered during the following 6-month period. Every 6 months, the same questionnaire was completed again, allowing the behavioral profiles and the following cycle of personalized messages to be updated.

The weekly personalized messages were structured as practical behavioral tasks matched to each profile. Their content included self-monitoring of food intake and emotions, identification of triggers for emotional or external eating, meal and snack planning, stimulus control, portion control, increasing fruit and vegetable intake, preparation of home-cooked meals, strategies to reduce evening eating, stress-management techniques, goal setting, problem solving, cognitive restructuring, relapse prevention, and strategies to reinforce self-care, autonomy, and realistic weight-loss expectations. These messages were intended to support adherence to the tailored food plan, reinforce behavioral self-regulation, and maintain participant engagement between face-to-face nutrition appointments.

1.4 Statistical analysis

Data analyses were performed with the software Statistical Package for the Social Sciences, namely descriptive statistics, distributional tests, and correlation tests. The significance level was set at $p < 0.05$ for all tests.

Descriptive results are expressed in terms of group means and standard deviations for continuous variables and relative frequencies for categorical variables. All variables were tested for normality of distribution using the Kolmogorov-Smirnov test. Both Pearson's correlations were conducted to examine associations between normally distributed variables and Spearman's correlations to examine correlations between non-normally distributed variables, but since Pearson correlations are robust against deviations from normal distribution in moderately large samples (Field, 2022), and the differences between Pearson and Spearman correlation coefficients were minimal, only the parametric results were reported. Correlation strength was interpreted according to Evans' classification, as cited in Papageorgiou (2022): very weak correlation (<0.20), weak correlation ($0.20-0.39$), moderate correlation ($0.40-0.59$), strong correlation ($0.60-0.79$), and very strong correlation (>0.80).

A minimum 5% weight loss was considered as a criterion for successful weight loss, since there is good evidence of significant health benefits from 5% weight loss (Jensen et al., 2013), and it is a common cut-off point recommended by international guidelines and used in reference studies in this field (Evans et al., 2019; IOM, 1995). A 3% maximum weight variation was considered to classify participants as "maintaining weight" (Turicchi et al., 2020).

Descriptive analyses were conducted in the full cohort of participants who started the program, including women with normal weight, pre-obesity, and obesity. Analyses of clinically relevant weight-loss success and correlates of weight change were restricted to participants with pre-obesity or obesity, because intentional weight loss was the primary therapeutic outcome of interest in this subgroup. Differences in percentage weight change between baseline BMI categories were assessed using one-way ANOVA at the 6-, 12-, and 18-month follow-up assessments. Homogeneity of variances was assessed using Levene's test. When the assumption of homogeneity of variances was not met, Welch's ANOVA and Games-Howell post hoc comparisons were used. When the assumption of homogeneity of variances was met, Tukey HSD post hoc comparisons were used. Effect sizes were estimated using eta squared. Due to the small number of participants at the 24- and 30-month assessments, these later follow-up points were interpreted descriptively and were not included in these comparisons.

2. RESULTS

Participants' retention rates on the program

A single longitudinal cohort was followed across multiple follow-up time points; however, not all participants had the opportunity to reach each follow-up assessment due to the study observation period. Specifically, 689 participants started the program with at least 6 months until the end of the data collection period and had the possibility of reaching a minimum of 6 months of follow-up during the present study.

Figure 1 shows the flow of the longitudinal cohort across follow-up time points, including the number of participants eligible for each assessment and the corresponding retention rates.

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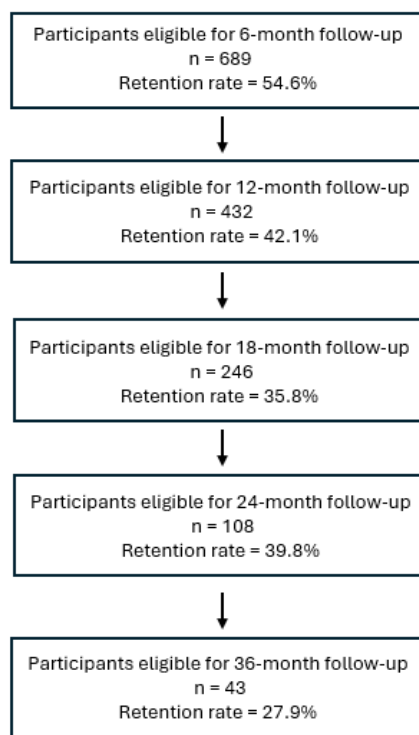


Figure 1 - Flow diagram of the longitudinal cohort across follow-up assessments

Sample characterization

Baseline descriptive results are presented for the full cohort, stratified by BMI category. Subsequent analyses of clinically relevant weight-loss outcomes focus primarily on participants with pre-obesity or obesity.

Sample characterization by BMI is displayed in Table 1. At the beginning of the program participants had 40.24 ± 13.21 years old, a BMI of $27.50 \pm 4.90 \text{ kg/m}^2$ (40.35% with pre-obesity and 25.40% with obesity) and a waist circumference of $90.90 \pm 11.88 \text{ cm}$. About 33% of the starting participants completed high school and 44% completed university studies.

Table 1 - Participants' characterization by BMI

	Normal weight (n=236)	Pre-obesity (n=278)	Obesity (n=175)
Age (years)	35.80 ± 11.97	42.47 ± 13.35	42.68 ± 13.11
Elementary school (%)	11.86	23.02	38.86
High School (%)	30.51	37.41	29.14
University (%)	57.63	39.57	32.00
Height (m)	1.62 ± 0.06	1.61 ± 0.06	1.61 ± 0.06
Weight (kg)	60.56 ± 5.48	70.29 ± 6.05	89.17 ± 11.98
BMI (kg/m^2)	22.93 ± 1.33	27.10 ± 1.40	34.32 ± 3.73
Waist circumference (cm)	81.25 ± 6.41	90.09 ± 6.64	105.18 ± 10.01

Lifestyle participants' characteristics by BMI are displayed in Table 2. Most of the participants report spending most of the day in a sitting position (53.1%) and report previous weight loss attempts (53.8%).

Table 2 - Lifestyle variables: participants' characterization by BMI

	Normal weight (n=236)	Pre-obesity (n=278)	Obesity (n=175)
Live alone (%)	15.7	10.4	11.4
Spend most of the day in a sitting position (%)	56.4	52.9	49.1
Previously a smoker (%)	14.9	21.2	16.8
Actual smoker (%)	14.4	16.9	11.4
Has previous weight loss attempts (%)	36.9	55.0	74.9
Drinks less than 1 L of water per day (%)	63.6	62.9	68.0
Eats breakfast everyday (%)	94.1	87.1	84.6
Eats to fast (%)	47.0	47.1	49.7

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Regarding Weight loss goals, around 38.2% of the participants reported a weight loss goal between 1 and 5 kg, 33.1% between 5 to 10 kg, 15.1% between 10 to 15 kg, and 13.6% more than 15 kg. Concerning just the participants with obesity 3,4% reported a weight loss goal between 1 and 5 kg, 21.1% between 5 to 10 kg, 27.4% between 10 to 15 kg, and 48,0% more than 15 kg. Nevertheless, 11.3% of the participants, reported that 3 months before starting the program they were already on a weight loss process and 29.0% reported that 3 months before starting the program they were gaining weight, while most of the participants (59.6%) reported to be maintaining the weight during the 3 months previously to starting the program. If we just consider the participants with obesity, 51.5% reported maintaining their weight during the 3 months prior to starting the program, while 32.1% reported weight gain and 16.4% reported weight loss.

Program effect on body weight

Table 3 presents mean weight change across follow-up according to baseline BMI category for the full cohort. Because a minimum 5% weight loss was used as a marker of clinically relevant success, success rates were calculated for participants with pre-obesity or obesity. In this subgroup, 31.9% achieved successful weight loss at 6 months, 34.1% at 12 months, 37.5% at 18 months, 45.2% at 24 months, and 25.0% at 30 months.

Table 3 - Program weight loss effectiveness by BMI.

	Normal weight	Pre-obesity	Obesity
6 months weight loss	-0.77 ± 2.07kg -1.28 ± 3.38% n=121	-1.82 ± 3.01kg -2.61 ± 4.34% n=163	-3.64 ± 4.13kg -4.05 ± 4.54% n=92
12 months weight loss	-0.75 ± 2.97kg -1.15 ± 5.24% n=50	-1.79 ± 3.58kg -2,54 ± 5.13% n=87	-3.30 ± 5.22kg -3.90 ± 6.18% n=45
18 months weight loss	-0.36 ± 3,99kg -0.55 ± 7.24% n=24	-1,55 ± 3,82kg -2,15 ± 5,53% n=47	-5,17 ± 5,47kg -6,11 ± 6,83% n=17
24 months weight loss	-1.09 ± 4.12kg -1.59 ± 6.88% n=12	-1.78 ± 3.84kg -2.49 ± 5.52% n=24	-5.11 ± 5.84kg -6.45 ± 4.90% n=7
30 months weight loss	-3.20 ± 3.81kg -5.34 ± 6.11% n=4	-0.80 ± 3.92kg -1.31 ± 5.47% n=6	-5.50 ± 6.22kg -7.02 ± 8.02% n=2

At 6 months, the percentage weight change differed significantly between BMI categories, Welch $F(2, 217.128) = 12.749, p < 0.001$, with a small-to-moderate effect size ($\eta^2 = 0.060$). Games-Howell post hoc comparisons showed significant differences between all BMI categories, with greater percentage weight loss observed in participants with obesity, followed by participants with pre-obesity and participants with normal weight.

At 12 months, percentage weight change showed a borderline significant difference between BMI categories, $F(2, 179) = 3.037, p = 0.050$, with a small effect size ($\eta^2 = 0.033$). Tukey HSD post hoc comparisons showed a significant difference only between participants with normal weight and participants with obesity, with greater percentage weight loss observed in the obesity group. At 18 months, percentage weight change differed significantly between BMI categories, $F(2, 85) = 4.025, p = 0.021$, with a small-to-moderate effect size ($\eta^2 = 0.087$). Tukey HSD post hoc comparisons again showed a significant difference only between participants with normal weight and participants with obesity, with greater percentage weight loss observed in the obesity group.

Correlates of weight change among participants with pre-obesity or obesity

Correlation analyses were restricted to participants with pre-obesity or obesity, in whom weight loss represented the main therapeutic target of the program.

Age was positively associated with weight change at 6 months ($r=0.134; p=0.033$; very weak correlation) and at 24 months ($r=0.358; p=0.048$; weak correlation): the younger the participants at the beginning of the program, the more weight they lost. The number of nutrition appointments with the registered dietitian performed during the first 6 months of the program was negatively associated with 6 months weight change ($r=-0.194; p=0.002$; very weak correlation), but not with the weight change of the following assessment periods: the participants that had more nutrition appointments in the first 6 months of the program lost more weight during the first 6 months. During the first 6 months, participants' mean nutrition appointments were 1.45 ± 0.75 (minimum 1; maximum 5).

Initial BMI was negatively associated with weight change at 6 months ($r=-0.251; p<0.001$; weak correlation), 12 months ($r=-0.297; p=0.037$; weak correlation) and 18 months ($r=-0.310; p=0.013$; weak correlation): the higher the initial BMI, higher weight loss.

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Initial weight loss goals were negatively associated with weight change at 6 months ($r=-0.254$; $p<0.001$; weak correlation), 18 months ($r=-0.349$; $p=0.005$; weak correlation) and 24 months ($r=-0.456$; $p=0.010$; moderate correlation): participants with higher weight loss goals lost more weight.

Previous weight loss attempts were positively associated with weight change at 18 months ($r=0.353$; $p=0.017$; weak correlation): participants who reported fewer previous weight loss attempts lost more weight.

Self-reported weight change during the 3 months before starting the program was positively associated with weight change at 12 months ($r=0.215$; $p=0.017$; weak correlation): Participants with a higher weight loss during the 3 months before starting the program had a lower weight loss at 12 months.

3. DISCUSSION

The women-only weight management program described in the present study showed interesting retention rates in the full cohort and was associated with clinically relevant weight loss among participants with pre-obesity or obesity. In this subgroup, 31.9% lost more than 5% of their initial body weight at 6 months, 34.1% at 12 months, 37.5% at 18 months, 45.2% at 24 months, and 25.0% at 30 months.

Considering that in Portugal, most women-only gyms (96%) have fewer than 250 members (AGAP, 2023), we estimate that the maximum potential N (total population of members of the 5 women-only gyms assessed in the Lisbon region) would be around 1250 women. Therefore, we estimate that our sample of 689 women who participated in the program and agreed to be included in our study represents around 55% of the population studied.

Mean 12-month retention rates in Portuguese gyms are around 31%, and it is known that the mean number of members per exercise professional in the gym is a relevant factor leading to an increase in the retention rate (AGAP, 2023). A possible explanation for the relatively high retention rates of the present study can be the fact that the mean member/exercise professional ratio in the 5 women-only gyms included in our study was around 50/1, while the Portuguese average is over 125/1.

An intriguing finding of our study was that the retention rate at 24 months was slightly higher than at 18 months (39.8% vs. 35.8%). We speculate that these differences occurred because of the different recruitment semesters of the study, namely from February to July and from August to January. One of the recruitment semesters includes both the months of August and December that are usually (and inclusively in Portugal) particularly challenging months for weight management (Turicchi et al., 2020). Our data also suggest that the participants that are for a longer time at the program have lower chances of quitting the program in the next 6 months.

In terms of weight loss efficacy, the program described in the present study achieved similar results to reference behavioral change programs performed in Portuguese subjects, in Lisbon as well, either in women or in both women and men. The randomized controlled trial "Promotion of Exercise and Health in Obesity" – a once per week 12 months behavioral change intervention in women with pre-obesity and obesity aiming to increase self-regulatory long term weight management skills – lead to a 7.27% mean weight loss (Silva et al., 2010), and INDIVIDUO – a patient-centred intervention in individuals with obesity (80% women), consisting in a nutrition appointment every 2 months during a 6 months period time and leading to a 3.92% mean weight loss (Camolas et al., 2017). Comparisons by baseline BMI category suggest that participants with obesity may derive greater relative weight-loss benefit from this type of program, highlighting the practical importance of interpreting outcomes according to initial BMI status and of tailoring expectations and follow-up strategies accordingly. Weight loss of this magnitude can be clinically relevant and may contribute to long-term health benefits, including reduced mortality risk in women with pre-obesity or obesity (Jensen et al., 2013; Tolvanen et al., 2023).

In addition to the analyses comparing BMI categories, some pretreatment variables showed statistically significant exploratory correlations with weight change among participants with pre-obesity or obesity at different assessment moments (6, 12, 18, and 24 months). According to commonly used correlation strength classifications (Papageorgiou, 2022), the observed associations were very weak to moderate, suggesting limited-to-moderate relationships between the analyzed variables. Previous weight-loss attempts, a previously identified pretreatment predictor of weight loss (Carraça et al., 2018; Jorge et al., 2020), showed a weak association with 18-month weight change in the present study, with fewer previous attempts associated with greater weight loss; similarly, higher initial BMI showed weak associations with greater weight loss at 6, 12, and 18 months, while higher initial weight-loss goals showed weak associations at 6 and 18 months and a moderate association at 24 months, although evidence regarding BMI and weight-loss goals as pretreatment predictors remains mixed (Carraça et al., 2018).

Another interesting finding was that self-reported weight difference during the 3 months before starting the program showed a weak positive correlation with 12-month weight change, suggesting that participants who reported greater weight loss before program initiation tended to achieve less weight loss during the first 12 months of the intervention. This type of variable, namely weight change close to the start of a weight-loss intervention, is often not studied as a potential weight-management correlate (Carraça et al., 2018; Varkevisser et al., 2019), but in the present study it emerged as a potentially relevant exploratory finding.

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Although exploratory analyses in normal-weight participants showed a similar directional pattern for this variable, these results were not central to the study objectives and are therefore not presented.

A higher number of nutrition appointments during the first 6 months of the program correlated with higher weight loss at 6 months, but not at the following assessment moments. This result may be due to the constant focus on autonomy promotion for weight management behaviors during nutrition appointments. In fact, scientific literature on this field shows that interventions which promotes the satisfaction of basic psychological needs (autonomy, competence and relatedness) leads to higher levels of physical activity and healthier eating habits, often leading to successful long term weight management (Martinez et al., 2022; Teixeira et al., 2012; Metzendorf et al., 2024). Furthermore, autonomy support was also provided through personalized online coaching, which may have contributed to reducing the relative importance of nutrition appointments throughout the program. Moreover, some participants may already have achieved their weight-loss goals within the first 6 months, which may also partly explain these results.

Practical implications

The present findings suggest that women-only gyms may represent a relevant real-world setting for delivering commercial weight management programs that combine exercise access, individualized nutrition counseling, and digital behavioral support. From a practice perspective, this type of program may be useful for women with pre-obesity or obesity who seek structured lifestyle support outside traditional clinical settings. The integration of registered dietitian appointments, tailored food plans, digital self-monitoring tools, and weekly personalized messages may help maintain contact with participants between face-to-face consultations and support behavioral self-regulation. These findings may also help health professionals better understand the structure, participant profile, and potential effectiveness of commercial weight management options available in community fitness settings.

Implications for future research

Future studies should further evaluate women-only commercial weight management programs using more controlled and methodologically robust designs, including comparison groups and broader samples from different regions and gym settings. Further research should also include systematic monitoring of exercise frequency, duration, intensity, and adherence, as these data were not available in the present study and could help clarify the specific contribution of the physical activity component. Besides, future studies should assess dietary adherence over time, reasons for attrition, and the independent validity of the behavioral profile system used to personalize the digital intervention. Longer-term studies with validated behavioral measures would also help determine which components of multicomponent commercial programs are most strongly associated with clinically relevant weight loss and weight-loss maintenance.

Study limitations

Some limitations should be considered when interpreting the results of this study: All the participants of this study were members of Portuguese women-only gyms in the Lisbon region; therefore, the results of this study may not apply to other population segments (e.g. men, members of other kinds of gyms, other regions and countries). In addition, the exercise component of the program consisted of access to the scheduled group classes described above, as well as to optional personal training services; however, variables such as exercise frequency, duration, intensity, and adherence were not systematically recorded in this commercial program and were therefore not available for analysis. We acknowledge that the absence of these data is a limitation, as it restricts the interpretation of the specific contribution of the physical activity component, limits the replicability of the intervention, and prevents these variables from being considered as potential confounders. The questionnaire used in this study was not developed for research purposes; therefore, some of the questions included were not validated (even though most of the questions came from previously validated questionnaires). In particular, although several items used to generate the behavioral profiles were adapted from or conceptually aligned with previously validated instruments, the profile-scoring system itself was developed for routine commercial use and was not independently validated as a psychometric tool. The combination of items adapted from existing instruments and items developed specifically for the commercial program may have limited the ability of the questionnaire to capture all potentially relevant behavioral dimensions, and some items may not fully reflect the specific sociocultural characteristics of this population. Most of the variables were self-reported and therefore could be affected by recall bias or social desirability bias; the moment when the participants achieved their weight loss goal was not identified and so some of the participants could have been in a weight maintenance phase instead of a weight loss phase after 6, 12, 18, or 24 months; only the anthropometric assessment was performed prospectively and all the other variables used were collected only during the pretreatment period, therefore, it was not possible to understand how other variables evolved during the study; attrition (a common issue in weight loss studies) and the progressive reduction in the number of participants (mostly in the 24 and 30 months assessments) require caution in the interpretation of the data; we stress that this study was based on a commercial program in which all the participants had to pay a monthly fee to be included, which may have contributed to attrition, particularly if the

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weight loss results or other related expectations were not achieved and even as a consequence of financial or professional issues; lastly, the causes of attrition were not assessed. Furthermore, the absence of a control group limits the possibility of drawing causal conclusions regarding the effectiveness of the program, since the observed outcomes cannot be exclusively attributed to the intervention itself.

CONCLUSION

This study evaluated the impact on body weight of a nationally relevant commercial weight management program delivered in Portuguese women-only gyms and combining exercise, nutrition, and weekly customized online follow-up. Among participants who remained engaged, the program was associated with reductions in body weight, particularly among women with pre-obesity or obesity. Weight-loss outcomes differed according to baseline BMI category at the main follow-up assessments, with greater percentage reductions generally observed among participants with obesity, although findings from later follow-up assessments should be interpreted cautiously given the smaller number of participants. These findings suggest that women-only commercial weight management programs combining lifestyle-based support and real-world implementation may represent a useful option for Portuguese adult women with excess weight seeking body weight reduction, while also contributing to a better understanding of participant profiles, weight-loss outcomes, and clinical decision-making in community fitness settings.

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AUTHORS' CONTRIBUTION

Conceptualization, R.J., I.S., V.T. and P.T.; data curation, R.J.; formal analysis, R.J.; funding acquisition, R.J. and P.T.; investigation, R.J., I.S., V.T. and P.T.; methodology, R.J.; project administration, R.J.; resources, R.J.; software, R.J.; supervision, V.T. and P.T.; validation, R.J., I.S., V.T. and P.T.; visualization, R.J., I.S., V.T. and P.T.; writing – original draft, R.J.; writing – review & editing, R.J., I.S., V.T. and P.T.

CONFLICT OF INTEREST

The authors declare a conflict of interest.

The first author of this study is the registered dietitian who conducted all the nutrition appointments of the study and is responsible for the study. Additionally, he was paid to perform those nutrition appointments and for all the follow-up performed using the client support app and website by the 5 gyms Vivafit® where the study was performed. This work was funded by Portuguese national funds provided by Fundação para a Ciência e Tecnologia (FCT) (UI/05704/2020) and did not have any the role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication.

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