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Original article

Cognitive and behavioral weight management strategies during the menopausal transition: Insights from the Menopause and Weight Loss (ME-WEL) project

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ABSTRACT

Objective: Most women experience weight gain during the menopausal transition, often attributed to behavioral factors. Nevertheless, some women successfully maintain a healthy weight during this phase. This study aims to identify the successful cognitive and behavioral weight management strategies employed by postmenopausal women who effectively maintained a healthy weight during the menopausal transition (from premenopause to postmenopause).

Method: Semi-structured interviews were conducted with 31 Portuguese postmenopausal women, aged 45–65 years (*mean and standard deviation* 54.06 ± 5.51) who successfully maintained a healthy weight (body mass index: 18.5 kg/m^2–24.9 kg/m^2) during the menopausal transition. The interviews were conducted via telephone *(n = 29)* and Zoom *(n = 2)*, based on the participant's preference, and ranged from 11 to 52 min *(22.06* ± 9.95). Using *MAXQDA* software, deductive-dominant content analysis of the interviews was performed. The *Interface of R for the Multidimensional Analyses of Texts and Questionnaire* software was used for lexical analysis.

Results: The qualitative analysis of *cognitive and behavioral strategies for successful weight management* yielded 17 categories and 37 sub-categories. Effective cognitive and behavioral strategies (e.g., planning content, stimulus control, support: help from others) were identified, mostly aligning with the Oxford Food and Activity Behaviors Taxonomy. Five new categories emerged: dietary choices, intuitive eating, food literacy, psychological self-care, and effortful inhibition.

Conclusion: Knowing effective cognitive and behavioral weight management strategies for menopausal women is relevant, especially considering their status as a high-risk group. This knowledge provides a valuable guide for designing weight management interventions, emphasizing the essential role of behavioral change.

1. Introduction

Despite challenges during the menopausal transition (e.g., weight gain prevalence), some women maintain a healthy weight, often attributed to healthier behaviors and lifestyles, enhancing overall health and life expectancy [1,2]. Middle-aged women often struggle with weight management, even if they achieve a healthy weight [3,4]. The National Weight Control Registry identifies effective strategies, including daily breakfast, regular weight monitoring, increased physical activity, frequent vegetable consumption, and a healthy diet [5]. Specifically for middle-aged women, successful strategies include dietary plan adherence, social support, problem-solving skills, planning content (plan types of food/physical activity in advance of performing behavior), and impulse management: acceptance (responding to impulses through acceptance of the feeling) [1,2,6].

Current literature primarily addresses weight management strategies in specific groups, mainly young adults and individuals maintaining weight loss, which may not directly apply to older populations [3,7]. Research on weight-related behaviors in menopausal women is a priority, given the knowledge gaps, limited data, and therapeutic approaches requiring a culturally appropriate perspective [6,8]. Culturally tailored behavioral interventions are necessary, considering individual

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differences in ethnicity, culture, socioeconomic status, and education [1]. Weight loss programs should be customized to recognize and address effective weight control strategies [6]. There is a need for a deeper understanding of these strategies for reproducibility and translatability [9].

A taxonomy focusing on cognitive and behavioral self-reported weight control strategies among adults with BMI $\geq$ 25 kg/m^2, known as the Oxford Food and Activity Behaviors (OxFAB) [6], has been developed. Recently, it was translated into a self-report instrument specifically for Middle-Aged Women (MAW): the OxFAB-MAW [2].

Recognizing the role of behavior in health maintenance and disease prevention and understanding which cognitive and behavioral weight management strategies are most effective at this stage is relevant [1,6,10]. This study aims to identify the successful cognitive and behavioral weight management strategies employed by women living in Portugal and maintaining a healthy weight during the menopausal transition, from premenopause to postmenopause.

2. Methods

2.1. Participants and measurements

We followed a non-probabilistic convenience sampling to study 31 postmenopausal Portuguese women. Inclusion criteria were i) women, ii) Portuguese nationality, iii) aged 45–65, iv) postmenopausal status, and v) maintaining a healthy body mass index (18.5 $\geq$ BMI $\leq$ 24.9 kg/m^2) with $\leq$5 % weight variation from premenopause to postmenopause. Exclusion criteria comprised i) premenopausal or perimenopausal status, ii) incomplete weight data, iii) weight maintenance during the menopausal transition, but falling into underweight, overweight, or obesity, and iv) experiencing weight gain or loss.

Women completed a self-reported questionnaire encompassing sociodemographic factors (e.g., professional status), health-related information (e.g., recent disease), lifestyle variables (e.g., physical activity practice), menopausal status (e.g., "*Have you ever gone 12 months (or longer) without having your period*?" [11], and self-reported weight and height for BMI calculation (weight [kg]/height[m]^2). Semi-structured interviews explored effective cognitive and behavioral weight management strategies. Questions like "In your opinion, what have you done (what actions or strategies did you employ) to successfully maintain a healthy weight during this long period from premenopause to postmenopause?" were employed.

2.2. Procedure

The ME-WEL project received approval from the Ethics Committee of ISPA–Instituto Universitário (ref. D/024/01/2020), following guidelines from the Portuguese Psychologist Association [12] and the American Psychological Association [13].

Firstly, an online survey was administered, exploring quantitative aspects related to menopause, weight management, and behavioral changes, and women interested in the second phase (interview phase) provided their contact information. The first author (ML) subsequently contacted them (by email or telephone) to gauge their interest. If still interested, a triage questionnaire focusing on inclusion criteria was administered. The recruitment process (including dropout reasons) is detailed in Fig. 1, and the final sample consisted of 31 postmenopausal women.

In the second phase, women were briefed on the study's objectives and nature (a PhD research) and gave informed consent, also granting permission for interview recordings. No pilot test was conducted. Interviews occurred between December 2020 and February 2021 and were conducted via telephone (n = 29) or *Zoom* (n = 2), based on women's preferences. They ranged from 11 to 52 min, averaging about 22 *min* (22.06 $\pm$ 9.95). There were no non-participants, and no interviews were repeated.

ML, a female psychologist and PhD student at the time of the study, conducted and audio-recorded interviews - ML was trained by FP, a senior psychologist, to conduct the interviews. Team members transcribed them to capture both verbal and non-verbal elements (e.g., pauses). Anonymity was ensured with alphanumeric codes. Transcripts were sent only to participants who requested them, and they did not provide feedback on the transcriptions or the results. ML reviewed transcriptions for accuracy and performed initial codification, refining codes with FP to reach a consensus.

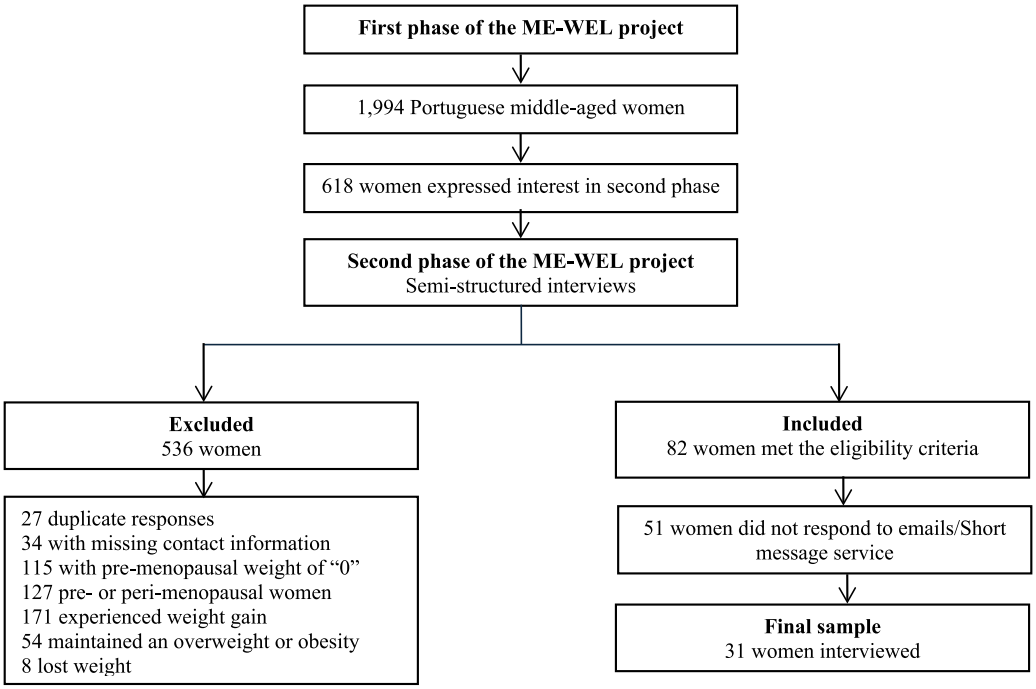

Fig. 1. The process of recruiting interviewed participants.

2.3. Data analyses

Interview analysis utilized MAXQDA 2020 software, employing a qualitative deductive-dominant analysis [14]. This method aligns with cognitive-behavioral models in weight management, mainly the OxFAB [6], allowing conceptual support and expansion upon OxFAB. The analysis involved a structured process incorporating (i) establishing a pre-existent category - *cognitive and behavioral successful weight management strategies*, (ii) establishing emergent subcategories within and beyond OxFAB dimensions, and (iii) identifying each subcategory in speech, followed by frequency and percentage analysis [14].

Inter-rater conformity was ensured for code consistency and analysis quality [14]. An external researcher coded three interviews to assess agreement, using Cohen's κ coefficient. The Cohen's κ values can range from −1 to +1: values ≤0 (no agreement), 0.01–0.20 (slight agreement), 0.21–0.40 (fair agreement), 0.41–0.60 (moderate agreement), 0.61–0.80 (substantial agreement), and values above 0.80 indicating almost perfect agreement [15]. IBM SPSS Statistics version 29.0 was used for descriptive analysis and Cohen's κ calculation.

Lexicometric analysis was conducted using the Reinert method with *Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires* (Iramuteq) 0.7 alpha 2 software, employing Python language and R statistical software (version 4.1.3) [16]. Descending hierarchical analysis (DHA) via factorial correspondence analysis (FCA) was performed to extract statistical classes represented by frequently mentioned words, revealing discourse regularities based on chi-square ($\chi 2$) values exceeding 3.84 (p-value <0.05) [16]. FCA evaluated associations between classes, indicating dependency (classes/words within the same quadrant or near lines) or independence (in distinct quadrants) [16]. Default settings were maintained for all data input options [16].

3. Results

3.1. Descriptive results and qualitative analysis

The socio-demographic, health, weight, and lifestyle characteristics of the participants (n = 31) are presented in Table 1 (Supplementary Material).

The qualitative analysis of *cognitive and behavioral successful weight management strategies* identified 17 categories and 37 sub-categories, encompassing 822 coded segments. These were grouped into (1) dietary choices, (2) effortful inhibition, (3) energy compensation, (4) engaging in physical activity/exercise, (5) food literacy, (6) information seeking, (7) intuitive eating, (8) planning content, (9) psychological self-care, (10) regulation: allowances, (11) regulation: restrictions, (12) regulation: rule setting, (13) restraint, (14) self-monitoring, (15) stimulus control, (16) support: help from others, and (17) weight management aids (Table 2). A final map with all emergent categories and subcategories is presented in Fig. 2 (Supplementary Material).

Table 2 contains all *cognitive and behavioral successful weight management strategies* categories and subcategories mentioned by at least 10 % of the sample. It includes definitions and speech excerpts, along with code frequency, participant mentions, percentage, and total mentions. Utilizing the codification developed from the preceding qualitative analysis, the assessment of Cohen's kappa reliability indicator reveals a moderate agreement (κ = 0.47) between the analyses of both researchers.

3.2. Lexicometric analyses

A corpus of texts (n = 40) was consolidated, totaling 15,855 words, with an average of 34 words per segment and 832 unique occurrences (Hapax coefficient = 5.25 %). The DHA divided the corpus into 464 segments, with 67.7 % (314 segments) analyzed through Iramuteq, and generated four classes (Fig. 3). The dendrogram showed two ramifications. Class 1 (labeled **Physical activity/exercise**), accounted for 29.6 %, emphasizing engagement in *physical activity/exercise*, *planning content*, *weight management aids*, and *support: help from others* (Fig. 3).

In the second ramification, Class 3 (**Healthy eating and psychological self-care**) constituted 16.2 %, Class 4 (**Weight control and monitoring**) 31.5 %, and Class 2 (**Dietary choices**) 22.6 %. Class 3 suggests a higher tendency towards a healthy diet, self-care, and some compensatory behaviors, associated with *psychological self-care, restraint*, *intuitive eating*, and *energy compensation* dimensions. Class 4 focused on weight monitoring and control, including *self-monitoring, effortful inhibition*, and *stimulus control* dimensions. Class 2 emphasized specific food types and can be incorporated into the *regulation: allowances, restrictions*, *rule setting*, and *dietary choices* dimensions (Fig. 3).

Fig. 4 displays the Cartesian plane with data related to each class alongside cognitive and behavioral weight management strategies identified by women. FCA reveals associations among words within classes and strategies identified in the directed-content analysis. *Dietary choices* (green) positioning on the positive quadrant of the axis, suggests moderate dependency compared to *physical activity/exercise* (red), as some words share the same positive quadrant, though they are considerably distant. However, *physical activity/exercise* is also positioned in the negative quadrant, indicating slight dependency on *healthy eating and psychological self-care* (blue) and *weight control and monitoring* (purple) classes, closely linked and positioned in the negative quadrant and near the lines. This highlights a more uniform positioning of word representations between *dietary choices*, *healthy eating and psychological self-care*, and *weight control and monitoring* classes, as evidenced by the DHC, contrasting with *physical activity/exercise's* more distant position.

4. Discussion

Our study demonstrated that Portuguese postmenopausal women who maintain a healthy weight during the menopausal transition employ several cognitive-behavioral weight management strategies. While most of these strategies align with the OxFAB Taxonomy, our research identified five new strategies that should be considered in future studies.

4.1. Successful weight management strategies in postmenopausal women

Our study confirms that during the menopausal transition, women employ strategies such as energy compensation, content planning, information seeking, regulation (involving restrictions, permissions, and rule-setting), restraint, self-monitoring, stimulus control, and weight management aids, and seek support from family and friends.

Five categories emerged not aligning with OxFAB. Based on two systematic reviews, *dietary choices* related to diet quality and healthy food choices (e.g., eating soup) [5,7,10]. *Effortful inhibition* [16,17], is related to OxFAB impulse management dimensions (*awareness of motives*, *acceptance*, *distraction*, and *substitution* [6]), though with a particularity - it involves inhibiting impulses through self-control [18]. This suggests considering a new strategy - *impulse management: inhibition* – in future research and interventions for menopausal women. Additionally, the concept of *food literacy* and the identified subcategories - *selection and acquisition* and *culinary competencies,* should be considered. *Food literacy* impacts knowledge, skills, and behaviors [19], associated with healthier food consumption and a balanced diet [19,20]. In this study, *intuitive eating* included *not restricted* and *physical reasons* subcategories, aligning with the Intuitive Eating Scale-2 dimensions [21]. It opposes rigid restriction and correlates with weight maintenance, improved diet quality, and physical health [22]. *Psychological self-care*, associated with maintaining/improving psychological health while addressing overall body needs [23], was the final emergent strategy. Middle-aged women with a healthy weight express concerns about their health, as psychological factors (e.g., self-esteem) can impact weight maintenance and vice versa [24].

Differentiating between *regulation: restrictions* and *restraint* (see

Table 2
Emergent categories and sub-categories resulting from deductive-dominant analysis regarding "cognitive and behavioral successful weight management strategies" in postmenopausal women who successfully maintained their weight from premenopause to postmenopause ($n = 31$).

Category [Sub-category]	Category/ Sub-category definitions	Example	n* (NM)**	%***
Dietary choices	Make daily healthy food choices [9]			
Maintain a healthy diet (unspecified)	Maintain a healthy diet without specifying particular food types or choices.	"The two main factors in weight maintenance are a healthy and diverse diet and exercise"; 57Y; BMI = 21.6	21 (59)	67.7
Eat protein-rich foods	Regular protein-rich foods consumption (e.g., fish, white meat).	"We basically consume white meat, such as turkey and chicken"; 54Y; BMI = 24.7	11 (21)	35.5
Eat soup	Regular soup intake.	"At our home, we eat soup for lunch and dinner, during summer and winter, it never fails"; 53Y; BMI = 18.7	9 (14)	29
Eat fruits and/or vegetables	Regular fruit and/or vegetable consumption.	"I eat a lot of vegetables, a lot of salads"; 65Y; BMI = 19.6	22 (51)	71
Fluid intake	Regular fluid intake (e.g., tea, water).	"I've been drinking a litre and a half of green tea daily for many years"; 53Y; BMI = 19.4	7 (15)	22.6
Effortful inhibition	Inhibiting unhelpful thoughts, feelings, or behaviors and refraining from acting on them [17]	"I tell myself 'no, don't eat more, it's over' and I know that I have to be stubborn with myself"; 54Y; BMI = 22.9	8 (18)	25.8
Energy compensation	Consciously adjusting behaviors to regulate energy intake, considering previous energy intake, to manage weight [6]			
Adjusting food portions	Adjusting food intake following previous consumption (e.g., a higher-calorie dinner).	"And if there's a day or two when I overeat (…) the next day I engage in fasting and carefully monitor my food intake"; 56Y; BMI = 21.8	8 (14)	25.8
Engaging in physical activity/exercise	Adopt more active behaviors, such as engaging in physical activity/exercise [5,9]			
Physical activity/exercise (Unspecified)	Engaging in physical activity without additional specifications.	"I led an active life [during the menopausal transition] and I maintained a brisk pace. Even when going for a walk, I walked very quickly"; 61Y; BMI = 23.8	15 (41)	48.4
Flexibility training	Flexibility training includes dynamic stretching (e.g., yoga or Pilates), and static stretching (e.g., flexibility training).	"At that time [during the menopausal transition] I enrolled in evening Pilates (…) you could see the difference"; 53Y; BMI = 18.7	8 (19)	25.8
Aerobic activity	Aerobic activity is performed with sufficient intensity and duration to improve cardiorespiratory fitness (e.g., running, swimming, walking).	"I played handball [during the menopausal transition]"; 57Y; BMI = 21.6	26 (86)	83.9
Information seeking	Seek information to improve knowledge and skills for weight management through sources such as online resources, magazines, and health professionals [6]	"And I do possess this knowledge [about healthy eating], not only because I search for information, but also because I've done training courses"; 56Y; BMI = 21.8	7 (8)	22.6
Food literacy	A set of knowledge, competencies, and behaviors related to food [18]			
Selection and acquisition	Conscious food selection and acquisition (considering label reading and prioritizing food product quality, such as organic or local products).	"I'm careful about the quality of the food I consume"; 58Y; BMI = 21.9	11 (34)	35.5
Culinary competencies	Concerning individual's culinary competencies, particularly in preparing food items, and utilizing cooking techniques.	"And vegetables I try not to cook… Vegetables have a lot of nutrients that I need, so I don't cook them"; 48Y; BMI = 20.5	5 (8)	16.1
Intuitive eating	Eating in response to hunger and satiety cues rather than in response to external impulses [20]			
Physical reasons	Eating in response to hunger cues rather than in response to emotional cues/distress.	"My relationship with food is very good, I eat to live, not live to eat"; 54Y; BMI = 22.9	9 (11)	29
Not restrict	Not implementing rigid dietary restrictions daily.	"I've never followed a diet, a restrictive diet"; 53Y; BMI = 18.7	8 (17)	25.8
Planning content	Plan types of food/physical activity in advance of performing behavior [6]			
Daily meals	Plan specific times of the day for meals (e.g., have a daily afternoon snack).	"So, I eat at 7 and 10 AM, 1, 5, 8 and 11 PM. I stick to the 3 h intervals, just like babies"; 53Y; BMI = 18.7	5 (11)	16.1
Healthy snacks for emergencies	Plan and carry healthy snacks when away from home (e.g., to work).	"I always have nuts in the car"; 48Y; BMI = 20.5	4 (12)	12.9
Incorporate physical activity into the daily commute	Opting for walking (instead of using a car/bus) and/or choosing the stairs over the elevator.	"I live on the 8th floor, and I always take the stairs both down and often up"; 58Y; BMI = 21.9	9 (25)	29
Physical activity/exercise plan	Plan and create a physical activity/exercise routine.	"At lunchtime, that is, instead of having lunch during my break, I'm taking an exercise class"; 50Y; BMI = 24.2	7 (15)	22.6
Psychological self-care	Engaging in psychological self-care behaviors (e.g., keeping the mind active, taking some time alone) [39]	"Our self-esteem must always be cultivated, and we must always maintain it. Go to the hairdresser regularly, or if you can't, paint your hair at home to keep your self-esteem up"; 54Y, BMI = 22.9	7 (18)	22.6
Regulation: Allowances	Allow unrestricted consumption of certain food and/or drinks [6]			
Diverse unrestricted food/ drink	Allow unrestricted consumption of certain food and/or drinks (without specification), at certain times.	"I go overboard when I have to. I don't go to a restaurant and say I only can eat this, no"; 48Y; BMI = 20.5	13 (24)	41.9
Unrestricted alcohol intake	Allow unrestricted alcohol consumption, at certain times.	"When I have dinner with my boyfriend, it's a bottle of wine for both of us and on the weekend, I drink beer until I want to"; 49Y; BMI = 24.6	4 (7)	12.9
Unrestricted carbohydrate-rich foods	Allow unrestricted consumption of carbohydrate-rich foods (e.g., rice, pasta, potatoes, and bread), at certain times.	"When I feel like eating bread, I eat"; 57Y; BMI = 23.4	11 (27)	35.5
Unrestricted sugary foods	Allow unrestricted consumption of sugary foods, at certain times.	"Occasionally, I make a mess, eat cake, and indulge in sweets"; 54Y; BMI = 24.7	14 (25)	45.2
Regulation: Restrictions	Avoid or restrict pre-specified (i.e., type) foods, behaviors, or settings [6]			
Reduce/eliminate pre-specified foods/drinks	Reducing or eliminating the consumption of certain types of food and/or drinks.			
Intake of soft drinks	Reducing or eliminating the intake of soft drinks.	"We don't drink soft drinks"; 48Y; BMI = 20.5	3 (5)	9.7
Alcohol intake	Reducing or eliminating alcohol intake.	"I don't drink alcohol"; 54Y; BMI = 19.3	4 (8)	12.9
Carbohydrate-rich foods	Reducing or eliminating the consumption of carbohydrate-rich foods (e.g., rice, pasta, potatoes, and bread).	"I stopped eating potatoes"; 65Y; BMI = 19.6	10 (22)	32.3
Dairy products	Reducing or eliminating the consumption of dairy products and their derivatives (e.g., butter, cheese, milk).	"I stopped drinking milk and eating cheese a long time ago"; 48Y; BMI = 20.5	6 (13)	19.4

(*continued on next page*)

Table 2 (*continued*)

Category [Sub-category]	Category/ Sub-category definitions	Example	n* (NM)**	%***
Fried, fatty, and junk foods	Reducing or eliminating the consumption of fried, fatty, and/ or junk foods.	"I avoid fast food and fried food"; 54Y; BMI = 18.6	11 (19)	35.5
Sugary foods	Reducing or eliminating the consumption of sugary foods (e. g., chocolate).	"Here at home, we don't consume sugar (…) even in coffee and tea, there's no consumption at all"; 54Y; BMI = 24.7	12 (19)	38.7
Meat	Reducing or eliminating the consumption of meat.	"We've taken red meat out of our diet"; 54Y; BMI = 24.7	9 (10)	29
Regulation: Rule Setting	Mandate responses to specific situations [6]			
Replace unhealthy options with healthier ones	Replacing less healthy foods (i.e., high-energy food) with healthier ones (i.e., low-energy food and drink).	"I usually try to choose healthier foods. For instance, instead of cookies I always opt for walnuts, almonds, or hazelnuts"; 53Y; BMI = 18.7	8 (24)	25.8
Restraint	Consciously restricting the amount of food consumed. This strategy can involve both flexible and rigid restrictions, adapting dietary control as needed [6]			
Flexible restraint	Some periods involve more dietary restraint than others (e.g., when clothes do not fit or when there is a 1 kg weight gain).	"If there's an extra kilo or half a kilo, the next day I'm eating salads. My eating behavior is different"; 50Y; BMI = 21.5	5 (13)	16.1
Reduce the amount of food daily	Consciously reduce the quantity of all types of daily food consumption.	"I don't eat much at dinner (…) If I have a good soup, I don't miss other types of food"; 50Y; BMI = 24.1	16 (42)	51.8
Self-monitoring	Regularly record specific behaviors or outcomes [6]			
Body shape measurement tracking	Monitor tightness of clothes, and rings.	"I wear the same pants. That's the secret, [I say to myself] My friend, today you can't fit into your pants, next week you'll have to"; 48Y; BMI = 20.5	4 (9)	12.9
Weight tracking	Monitor weight-related outcomes (e.g., self-weighting).	"As someone who values appearance, I weigh myself every week"; 50Y; BMI = 21.5	8 (20)	25.8
Stimulus control	Modifying the environment to make it conducive to desired behaviors [6]			
Avoid unhealthy food at home	Keep unhealthy foods and/or drinks out of the house.	"I try to avoid purchasing high-calorie items. I love a can of condensed milk, and I can finish it in seconds, so I don't buy it"; 50Y; BMI = 21.5	4 (8)	12.9
Support: Help from others	Getting support from others for weight management [2,6]			
Support: Buddying	Getting support from a family member or friend (e.g., engaging in diet/exercise together).	"My husband was very strict [during the menopausal transition]. He was the one who controlled the chocolates in the house, so he would only bring me half a square."; 53Y; BMI = 18.7	7 (11)	22.6
Support: Professional Help	Getting professional help (e.g., help from a health care professional, or personal trainer).	"At the time, I consulted the personal trainer, and they provided me with a morning exercise routine",53Y; BMI = 18.7	8 (12)	25.8
Weight Management Aids	Use/purchase of aids to achieve weight management (e.g., meal replacement, exercise equipment) [6]	"I have done a lot of things, including using Herbalife shakes [during the menopausal transition], but I haven't done that for a long time now"; 58Y; BMI = 23.7	4 (7)	12.9

n* = participants who mentioned the sub-category, considering the total sample (n = 31).
NM** = total number of times the sub-category was mentioned.
%*** = percentage of participants who mentioned the sub-category.
Y = Years (age).
BMI = Body mass index.

definitions in Table 2) is important. While both involve restrictions on physical activity and/or food intake, *regulation: restrictions* focus on quality, considering settings, times, and places, whereas *restraint* focuses on quantity. Distinguishing between these categories in participants' discourse was challenging, urging further review and clarification in future studies.

The predominant strategies were physical activity/exercise, specifically *aerobic activity* (83.9 %), and *dietary choices*, particularly *eating fruits and/or vegetables* (71 %) and *maintaining a healthy diet* (*unspecified*; 67.7 %). These findings align with several studies [5,7,10,22], although others highlight *impulse management: acceptance* and *planning content* as predominant strategies in healthy-weight middle-aged women [2]. Between 2007 and 2017, a decline in women's physical exercise but an increase in dietary control and healthy food consumption was observed [25].

All women mentioned several strategies, but most were discussed by less than half, suggesting a possible non-unidirectional pattern [10], with a combination of strategies (e.g., some days more restraint, others more allowances - postmenopausal women prefer flexible diets, balancing healthy eating and enjoyment [8]). The emphasized strategy of *regulation: allowances* may be important in future interventions. Furthermore, this study demonstrates the proximity of strategies emerging from *Healthy eating and psychological self-care* and *Weight control* classes, slightly associated with *Dietary choices*. *Physical activity/exercise* class appears to operate independently [10].

Several strategies identified in this study align with recent obesity treatment guidelines [27] and the Practical Guide for Gynecologists on Weight Management Module for Perimenopausal Women [28], including self-monitoring, information seeking, and stimulus control. Strategies like eating slowly, more frequently, counting calories, or regular breakfast intake [5,10,26] were not found in our study, possibly due to sample characteristics like menopausal process or age. This suggests the importance of considering specific strategies for women in this life stage [7], inclusive because many women may lack adequate knowledge of weight management [8]. Additionally, studies should continue to focus on behavioral and cognitive strategies while considering the impact of other variables on weight outcomes, including genetic and environmental factors [29].

4.2. Limitations and strength

This study presents limitations. *Firstly,* the small sample size, despite its qualitative approach, was mainly due to pandemic challenges and difficulty finding women with these specific BMI characteristics. *Secondly,* pandemic-conducted interviews via telephone or online might have impacted responses. *Thirdly*, sample bias existed, with participants predominantly highly educated, professionally active, and in relationships with children, potentially influencing some behaviors.

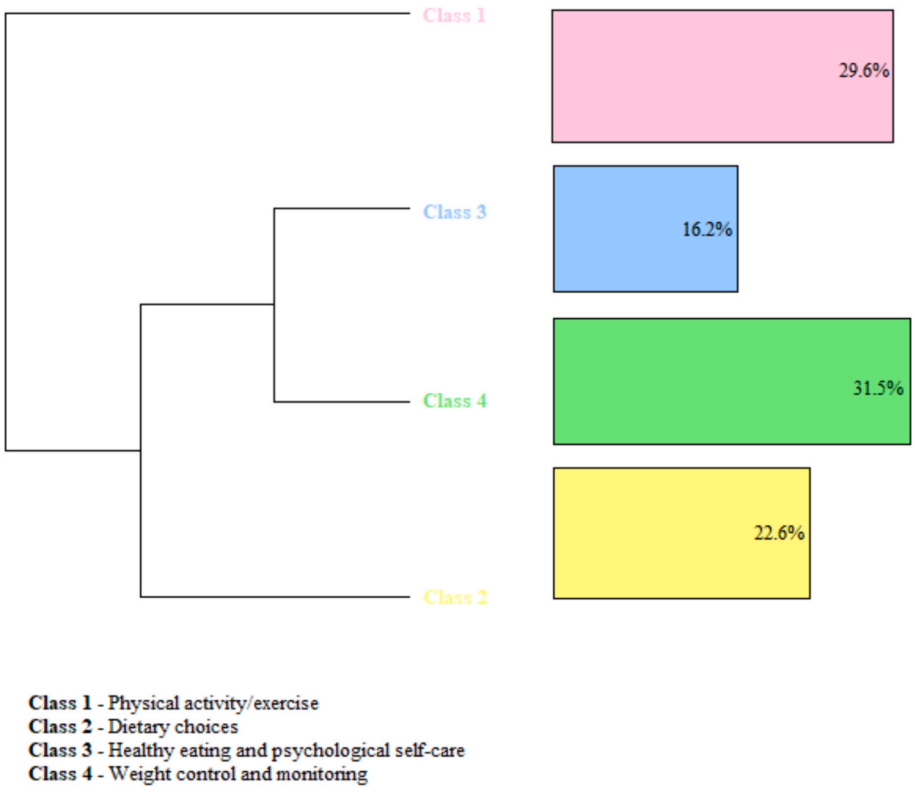

Fig. 3. Descending hierarchical dendrogram of the weight management strategies of postmenopausal women.

Additionally, online recruitment limited participation among women with lower digital literacy. *Fourthly*, self-reported weight and height may have introduced bias, although literature supports their validity [30]. *Lastly*, the study only explored cognitive-behavioral strategies, overlooking psychological traits (e.g., self-control) and emotional regulation strategies (e.g., emotional triggers awareness).

Despite limitations, the study's focused exploration of cognitive-behavioral strategies for weight management, particularly for postmenopausal women, is valuable. The qualitative approach allowed in-depth analysis, augmented by Iramuteq software. Moderate inter-rater agreement enhanced reliability. Emphasizing strategies tested by middle-aged women underscores their practical applicability in clinical and community interventions addressing menopause-related education/information.

5. Conclusion

This study highlights successful weight management strategies among postmenopausal women, including regular physical activity, dietary choices, self-monitoring, planning content, stimulus control, psychological self-care, food literacy, intuitive eating, and effortful inhibition.

Contributors

Mafalda Leitão contributed to the study concept and design, collecting and interpreting the data, composing the statistical data set, performing the analyses, and writing the manuscript.

Faustino R. Pérez-López contributed to the supervision and critical revision of the manuscript.

João Marôco contributed to statistical analysis and interpretation, supervision, and a critical revision of the manuscript.

Filipa Pimenta contributed to the study concept and design, interpreting the data, supervision, and critical revision of the manuscript.

All authors contributed to the study and reviewed and approved the final version of the paper.

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Ethical approval

The ME-WEL project received approval from the Ethics Committee of Ispa–Instituto Universitário (ref. D/024/01/2020), which follows the guidelines set by the Portuguese Psychologist Association [21] and the American Psychological Association [22]. The study's objectives were explained to participants, and their informed consent was obtained, granting permission for the recording of the interviews.

Provenance and peer review

This article was not commissioned and was externally peer reviewed.

Data sharing and collaboration

There are no linked research data sets for this paper. The participants of this study did not give written consent for their data to be shared publicly, so due to the sensitive nature of the research supporting data is not available.

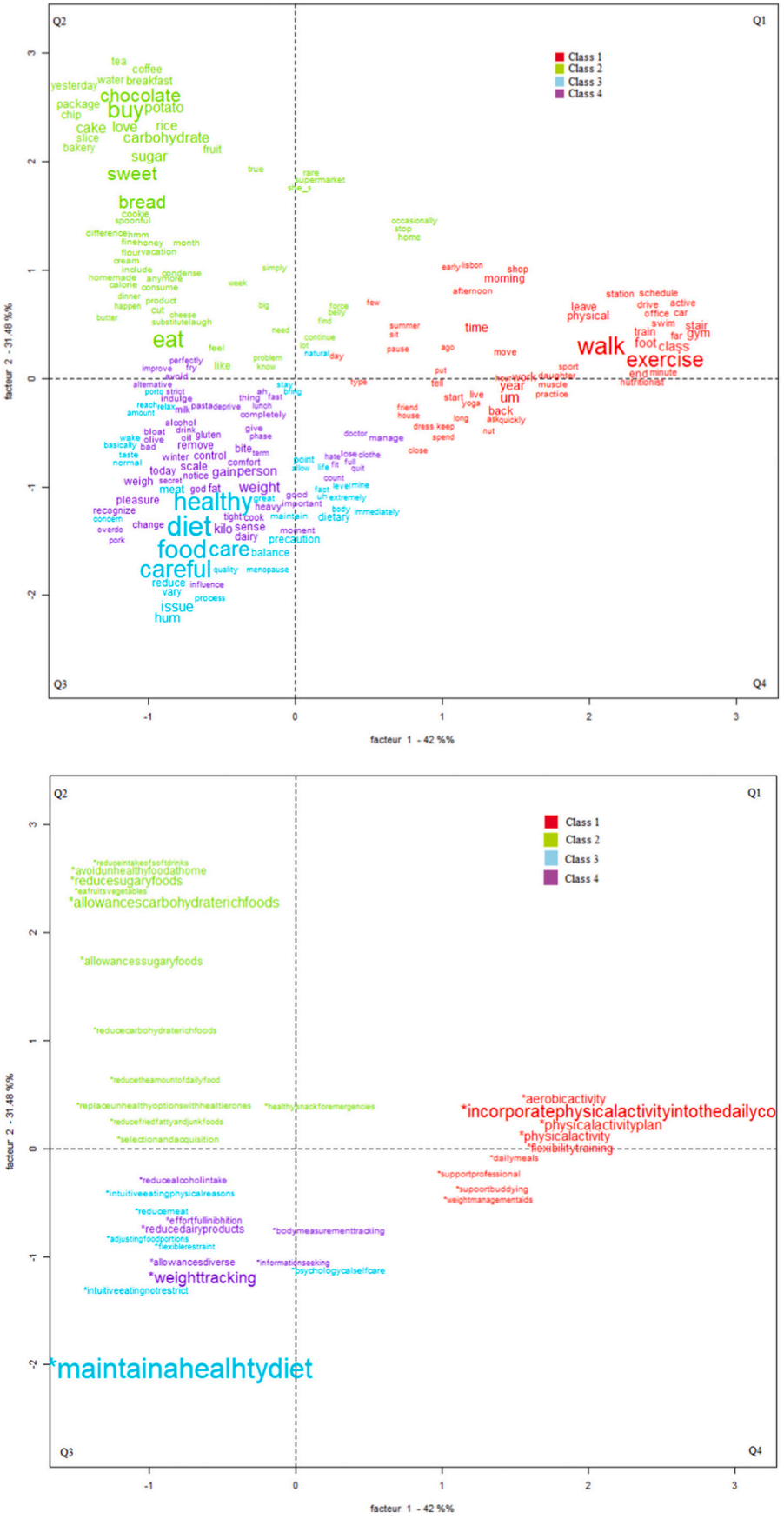

Fig. 4. Factorial Correspondence Analysis of the words (top) and the cognitive and behavioral weight management strategies (button).

Declaration of competing interest

The authors declare that they have no competing interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.maturitas.2024.108060.

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