ARTIGO ORIGINAL

Failure of a single nutrition counseling session for climacteric women

Insucesso de uma sessão única de aconselhamento nutricional para mulheres climatéricas

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ABSTRACT

Background: Due to the alarming growth of obesity over the world, strategies of nutritional guidance are necessary for the treatment and prevention of this disease. Thus, the objective of the present study was to provide a single session of nutritional counseling to a group of climacteric women and to assess the efficacy of this procedure 2 years later and to calculate the concordance between methods that evaluate body composition.
Methods: Anthropometric, dietary and physical activity data were collected from the volunteers studied, who were then counseled about correct eating habits and the importance of physical activity during a single visit lasting 120 minutes. Two years later, the same women were reevaluated on the basis of the same criteria as used for the initial evaluation. Body composition and energy expenditure were assessed by bioelectrical impedance, DXA and indirect calorimetry, and food intake was calculated. Anthropometric measurements were made and laboratory tests were also performed. The initial and final analyses were compared statistically by the Wilcoxon test for paired samples and the St. Laurent test was applied to determine the concordance of the methods for the determination of body composition.
Results: Ten women were followed up during the study period and their mean (±SD) age was 54 ± 8 years at the beginning of the study. The dietary history of the subjects studied showed deficient intake of calcium, vitamins, zinc and fibers both at the beginning and at the end of the study. A greater intake of cholesterol and carbohydrates occurred at the end of the study. The anthropometric measurements and all other body composition measurements remained constant, with concordance between the anthropometric and DXA measurements regarding body mass.
Conclusion: The data show the inefficiency of a single visit or counseling session regarding a change of nutritional habits in these patients, despite the limited number of participants.

Keywords: nutrition, obesity, menopause, aging, counseling.

1. INTRODUCTION

Adequate food intake varies according to the physiological status of a person and is fundamental for the maintenance of eutrophy[1]. Particularly among women, during the climacteric phase changes occur in body composition, characterized by reduced muscle mass and increased fat mass associated with inadequate eating habits[3]. It has been suggested that hormonal changes characteristically occurring in the climacteric may result in reduced energy metabolism and in stimulation of fat accumulation[4, 5].

Another aggravating factor for this population group is that energy expenditure due to exercise is reduced during this phase[6]. On this basis, these women must be counseled about an adequate nutrient intake, the maintenance of a healthy weight and the performance of physical activity. Thus, the objective of the present study was to evaluate, from a nutritional viewpoint, a population of climacteric women before and two years after a dingle qualitative nutritional intervention and to assess the effectiveness of such intervention. Besides, another aim was to calculate the concordance between methods that evaluate body composition.

2. METHODS

2.1 Cases

Women aged 35 to 65 years, from the Multidisciplinary Climacteric Outpatient Clinic (ACLI in the Portuguese acronym) of the University Hospital, Faculty of Medicine of Ribeirão Preto (HCFMRP/USP), were followed up for two years with regular visits to. Non-probabilistic convenience and voluntary sampling was performed. Inclusion criteria were: non-smokers, not in use of medications or corticoids that might interfere with energy metabolism such as hypo- or hyperparathyroidism, and non-users of hormone therapy.

The study was approved by the local Ethics Committee and eligible volunteers gave written informed consent to participate in the study.

2.2 Study design

A single meeting lasting about 2 hours was held with the participants at the beginning and at the end of the study. The meeting involved an interview for the collection of data regarding diet and physical activities. Anthropometric data were also obtained. During the second, indirect calorimetry was used to measure resting energy expenditure (REE) and energy substrate oxidation, dual-emission X-ray absorptiometry (DXA) and bioelectrical impedance analysis (BIA) were used to measure body composition.

The patients were first counseled about a healthy diet with explanatory leaflets containing the food pyramid and the ten steps for a healthy diet[7]. The food groups (complex carbohydrates, lipids, proteins, vitamins, minerals, and sugars) were defined in a qualitative manner. The participants were also counseled about the regular practice of physical activity, i.e., at least 30 minutes of physical activities at least 3 times a week.

2.3 Food consumption

Habitual food consumption was estimated with a Quantitative Food Frequency Questionnaire (QFFQ), validated for the day, week and month in a specific population[8]. Thirty-eight foods were classified as follows: milk and dairy products; bread and breakfast cereals; rice and pastas; vegetables; fruits; meats; drinks; sweets and cakes. During the interview, food portions were explained to the volunteers using a catalogue with pictures illustrating the usual food portions[9]. Nutrient content was calculated using the Dietsys® software, which requires double entry in order to avoid errors.

2.4 Practice of physical activities

The practice of physical activities was assessed using the long version of the International Physical Activity Questionnaire[10].

2.5 Anthropometry

Weight, height, tricipital, bicipital, suprailiac and subscapular skinfold thicknesses, waist circumference and hip circumference were measured. Body mass index (BMI) was calculated and percent body fat was determined by the sum of the 4 skinfolds[11], and percent lean mass was determined as the difference from total body mass.

The measurements were made in triplicate always by the same examiner. Waist circumference was determined with a flexible inextensible tape around the smallest circumference between the last ribs and the iliac crest during expiration. Hip circumference was measured around the maximum extension of the buttocks, with the subject standing up and wearing light clothing. Weight was measured with a Filizola electronic scale with 0.1 kg precision after the participant voided her bladder[12]. Height was measured in meters using an inextensible graduate rod. Skinfolds were measured with a Lange adipometer with a scale up to 65 mm, 1 mm precision and a constant pressure of 10 g/nm^2.

BIA was performed with a Biodynamics® apparatus, model 450, providing resistance and reactance values that were used to calculate fat and lean mass by means of formulas destined to healthy adults. Formulas were obtained from a healthy European population of 22-94 years with a BMI between 17 and 33.8 kg/m^2 [13].

2.6 Resting energy expenditure

Resting energy expenditure (REE) was measured with a Sensor Medics indirect calorimeter (Yorba Linda, CA, USA) using the method of expired air dilution, oxygen consumption and carbon dioxide production. The instrument was first calibrated with two gas mixtures: the first consisting of 16% O_2 and 3.8% CO_2, and the second consisting of 26% O_2 and O% CO_2 plus ambient air. The measurements lasted 30 minutes and the values obtained were analyzed one by one, with those showing a variation of more than 10% being discarded. Mean $V0_2$ values (consumed oxygen) and VCO_2 (produced carbon dioxide) were used to calculate REE by the formula of Weir[14], and to calculate energy substrate oxidation by the formula of Frayn[15]. For protein oxidation, urinary N_2 was calculated by the Kjeldahl method[16].

2.7 Statistical analysis

Data were analyzed by calculating the mean and the standard deviation. Since these were two stages of a study on the same population and since the population did not show normal distribution, the Wilcoxon test for paired samples was applied.

Concordance between the methods for evaluation of body composition (anthropometry, BIA and DXA) was calculated by the St. Laurent coefficient[17]. All calculations were made using the SAS/STAT® software, version9. Bland-Altman graphs were obtained with the R software.

3. RESULTS

Ten volunteers aged 54 ± 8 years (mean ± SD) at the beginning of the study participated in the present investigation. The diet and anthropometry data obtained at the beginning and at the end of the study are presented in Tables 1 and 2, respectively.

Table 1 show that there were important nutritional deficiencies when the results were compared to recommended nutrient intake[18-20] at the beginning of the study, regarding calcium, fibers, vitamin E and zinc. The same deficiencies were observed at the end of the study, with the addition of increased cholesterol consumption.

Table 2 shows that the BMI of the participants was above 24.9 kg/m², which indicates excess weight as well as increased waist circumference and percent body fat. The table also shows that there was no statistically significant difference in the anthropometric data obtained before and after the study.

The results of body composition estimated by DXA, BIA and anthropometry at the end of the study are listed in Table 3 and Figure 1, together with the coefficients of concordance between methods. It can be seen that percent body fat was high and percent lean mass was below expected values, as estimated by all three methods. Regarding the concordance between methods, the method that was closest to the gold standard (DXA) for the estimate of body composition was anthropometry (0.57). However, all coefficients of concordance had low values (Table 3).

Regarding the practice of physical activities, 7 participants were classified as active, 1 as sedentary, 1 as very active and 1 as insufficiently active at the beginning of the study. Among the active ones, one became insufficiently active at the end of the study while the others remained active. Those classified as sedentary, very active and insufficiently active at the beginning of the study become active at the end.

Finally, the results of REE and rate of energy substrate oxidation are presented in Table 4. It can be seen that, at rest, the participants oxidized more carbohydrates, followed by lipids and proteins.

4. DISCUSSION

The present study showed that there was no difference in eating habits or anthropometric data of climacteric women two years after a single session of nutritional intervention.

The first important point to be discussed is the diet. Four participants showed an energy intake below their energy expenditure (28% less, on average) and 6 of them showed an energy intake above it (42% more, on average). Among the nutrients studied, calcium, fibers, vitamin E and zinc were below recommended levels, a fact that was repeated two years later, with the addition of inappropriate cholesterol consumption. Compared to other Brazilian studies, errors were observed regarding calcium intake, whereas iron and vitamin A and C levels were adequate[21]. Another study detected adequate consumption of calcium, iron and cholesterol[22].

It is interesting to note that there was no change in eating habits after a single counseling session despite a careful explanation with emphasis on a healthy diet and on the practice of physical activities. This fact emphasizes the need for continuous nutritional monitoring so that learning will be effective. This monitoring could be provided in programs of dietary education with a more constant presence of the multidisciplinary team and diversified counseling, a procedure that has been found to be more effective[23].

The nutritional status and anthropometry data obtained here were similar to those of previous studies[24,25]. In this phase of life, women tend to present excess weight, explained in part by the reduction of lean body mass, which is determined by the energy metabolism of the organism[26]. Another factor that explains weight gain is the fact that the energy expended with exercise is also decreased in this phase of life among women[27]. On this basis, with the reduction of energy metabolism and energy expenditure with exercise, women tend to gain weight unless they control their diet and/or exercise more.

Although most women were considered to be active based on the physical activity questionnaire used, few women stated that they frequented gyms, danced or walked regularly. Although the energy expenditure involved in some domestic tasks is considered high, part of the women studied fragmented this activity along the day or even the week.

When the 3 methods for the measurement of body composition used in the present study (anthropometry, BIA and DXA) were considered, anthropometry was the one closest to the gold standard method (DXA). This may be explained by the fact that the equation used to estimate fat mass by BIA was not the best for our population[28]. In general, the data obtained by BIA were inferior to those obtained by anthropometry and DXA.

Although anthropometry is a relatively easy, low-cost and noninvasive method, it requires a trained examiner. In addition, the measures may not be so precise in a population with excess weight. Regarding BIA, most of the formulas have been validated in Caucasian individuals. Some studies have shown that subjects of other ethnic groups such as Asians, Blacks and Hispanics seems to have a greater deposit of fat in the trunk than in the limbs and seem to have more subcutaneous fat in the upper part of the body compared to Caucasians[38]. An important limitation when the 3 methods were compared was the fact that a multicomponent model (DXA) was compared to a bicomponent method (anthropometry and BIA), which are based on different principles.

Regarding the oxidation of energy substrates, a predominant intake and greater oxidation of carbohydrates was observed in relation to the remaining macronutrients[23,29].

The following point is underscored: on the basis of substrate oxidation, women expended energy, on average, in the form of 170 g/d carbohydrate, 72 g/d lipid and 31 g/d protein and, at the same time, ingested 201 g/d carbohydrate, 51 g/d lipids and 63 g/d proteins. Thus they ingested more carbohydrate than they oxidized, a fact that may be related to the excess weight. Thus, one may question the truthfulness of the replies of the participants or even the effectiveness of the method for the evaluation of food consumption.

5. CONCLUSION

With the present study, we conclude that a single session of nutritional counseling was not sufficient to improve the anthropometric indicators and the diet of a group of climacteric women with excess weight followed up for 2 years, , despite the limited number of participants.

6. ACKNOWLEDGMENTS

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Table 1 - Habitual food consumption estimated by a food frequency questionnaire (FFQ)

Nutrients	Beginning	Two years later	p-value*
Energy (kcal/d)	1506±693	1710±707	0.39
Proteins (g/d)	63± 37	85±63	0.33
Lipids (g/d)	51±28	55±33	0.65
Carbohydrates (g/d)	201±97	209±90	0.39
Calcium (mg/d)	670±441	709±315	0.72
Phosphorus (mg/d)	947±503	1154±681	0.28
Iron (mg/d)	9±6	11±5	0.31
Sodium (mg/d)	1519±1233	1512±744	0.65
Potassium (mg/d)	2001±1030	2772±1385	0.20
Vitamin A (mgRE **/d)	738±477	930±375	0.65
Vitamin C (mg/d)	118±84	224±202	0.17
Cholesterol (mg/d)	161±85	218±198	0.44
Fibers (g/d)	12±7	18±12	0.14
Vitamin E (µ α-TE *** /d)	6±3	8±4	0.31
Zinc (mg/d)	7±5	9±6	0.36

*Nonparametric paired Wilcoxon test, **Retinol equivalents, ***α-Tocopherol equivalents.

Table 2 - Anthropometric values of the volunteers (mean ± SD) at the beginning and at the end of the experimental protocol

Measurements	Beginning	Two years later	p-value*
Weight (kg)	70±14	70±14	0.31
BMI (kg) +	29±5	29±5	0.31
WC (cm)+	87±11	90±8	0.24
HC(cm)+	104± 11	104±8	0.88
TST (mm)+	29±7	30±8	0.78
BST (mm)+	24±6	22±7	0.44
SST (mm)+	27±6	28±8	0.67
SIST (mm)+	31±8	34±8	0.37
%BF +	43±3	44±4	0.09
%LM +	57±3	56±4	0.09

*Nonparametric Wilcoxon test.; +BMI = Body mass index, WC = waist circumference, HC= hip circumference, TST= tricipital skinfold thickness, BST= bicipital skinfold thickness, SST = subscapular skinfold thickness, SIST= suprailiac skinfold thickness, %BF= % body fat, %LM= % lean mass.

Table 3 - Fat and lean mass values estimated by three methods

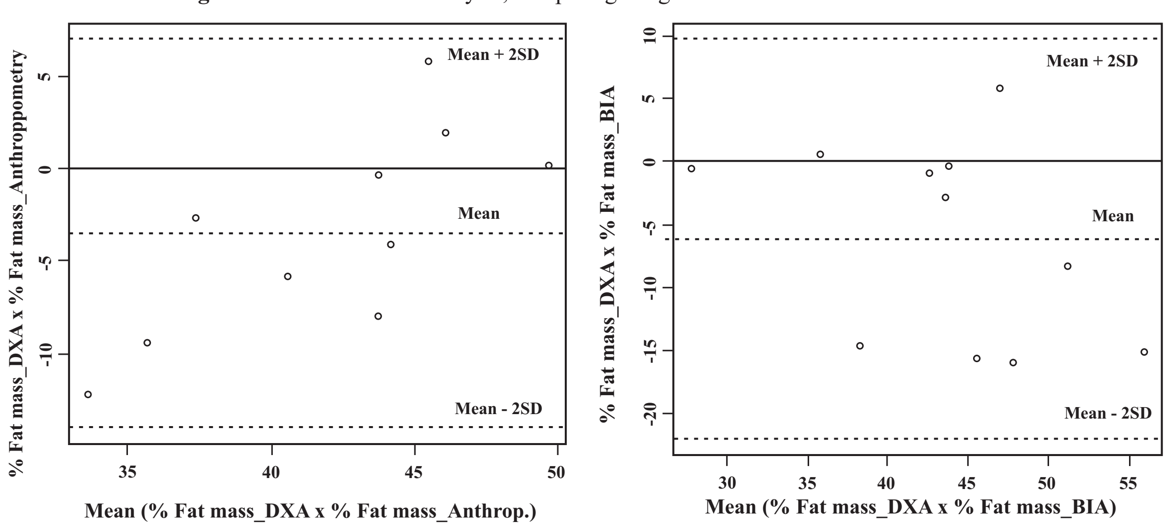
	DXA	BIA	Anthropometry
% Fat mass	40.3±7.4	47.0±10.4	43.7±3.5
% Lean mass	59.7±7.4	53.0±10.4	56.3±3.5

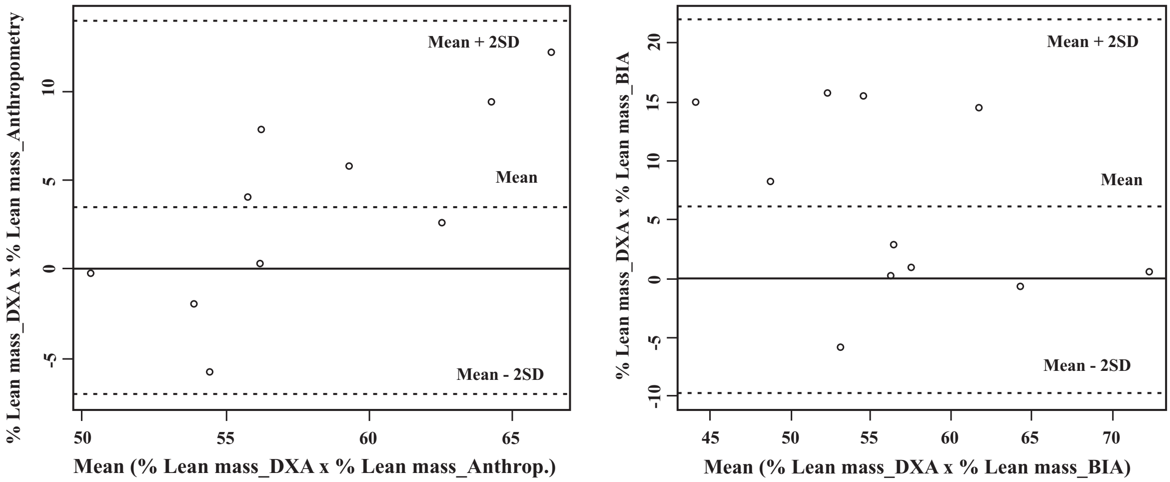
*Coefficient of concordance for fat mass: DXA and anthropometry = 0.57 (95% CI = 0.44;0.75), DXA and BIA = 0.34 (CI=0.14;0.64). Lean mass: DXA and anthropometry= 0.57 (CI = 0.41;0.70), DXA and BIA = 0.34 (CI = 0.17;0.76).

Table 4 - Resting energy expenditure (REE) and substrate oxidation measured by indirect calorimetry

	Values
REE (kcal/d)	1373±302
VO_2 (g/min)	0.196±0.045
VCO_2 (g/min)	0.162±0.033
RQ	0.83±0.06
CHO oxidation (g/min)	0.118±0.046
Lipid oxidation (g/min)	0.050±0.031
Protein o xidation (g/min)	0.022±0.012

Figure 1 - Bland-Altman analysis, comparing the gold standard method with BIA and

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