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**ORIGINAL**

# Dietary intake in the postoperative bariatric surgery at a university hospital in Rio de Janeiro

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KEYWORDS

Obesity;

Bariatric Surgery;

Recommended Dietary Allowances;

Diet Records;

Dietary Intake.

## ABSTRACT

**Introduction:** bariatric surgery is a treatment for morbid obesity that besides result in high weight loss promotes improvements in laboratory tests and in the pressure reduction. However the surgery can cause bad effects as deficiency some nutrients. This fact become more important evaluates the adequacy of dietary intake of these patients. The objective this study was evaluates the adequacy dietetic of patients after bariatric surgery.

**Material and methods:** we select forty women who underwent Roux-en-Y gastric and carried evaluation anthropometric and dietetic. The dietary evaluate was compared with the daily consumption requirement and food pyramid for these patients.

**Results:** forty women with 43.1 ± 9.96 years, obesity and very high risk for metabolic complications associate with obesity, and with acceptation of supplementation (95%) participated this study. The majority of women consumed group's foods "high-calorie foods, fats and sweets are energy-dense foods" and showed high intake of foods groups "grains and cereals" and "high-fiber, low-calorie foods". Dietary intake was low-calorie (1342.50 ± 474.06 Kcal), adequate in protein (22.10 ± 6.94%), carbohydrate (50.74 ± 10.96%), lipid (26.14 ± 7.17%), saturated fatty acids (8.69 ± 2.74%) and polyunsaturated fatty acids (8.93 ± 3.51%) and low-monounsaturated fatty acids (4.13 ± 1.78%) and fibers (17.02 ± 10.64 g).

**Conclusions:** nutritional habits of women showed inadequacy, these results reinforce the importance of nutritional accompanying in the late postoperative bariatric surgery.

**Ingesta dietética en el postoperatorio de la cirugía bariátrica en un hospital universitario en Río de Janeiro**

PALABRAS CLAVE

Obesidad;

Cirugía Bariátrica;

Ingestas Dietéticas de Referencia;

Registro Dietético;

Ingesta Dietética.

**RESUMEN**

**Introducción:** la cirugía bariátrica es un tratamiento para obesidad mórbida y además de resultar en elevada pérdida de peso produce mejoras en marcadores bioquímicos de los sujetos y una reducción de la presión arterial. Sin embargo, la cirugía puede provocar efectos negativos como deficiencias de algunos nutrientes. Esto hace que sea importante evaluar la adecuación dietética de estos pacientes. El objetivo de este estudio fue evaluar la adecuación dietética de pacientes después de la cirugía bariátrica.
**Material y métodos:** se seleccionaron 40 mujeres sometidas a gastroplastia en Y de Roux y se llevó a cabo las mediciones antropométricas y dietéticas. La evaluación dietética fue comparada con el requerimiento de ingesta diaria y la pirámide nutricional para estos pacientes.
**Resultados:** participaron en el estudio cuarenta mujeres con 43,1 ± 9,96 años, obesas y con riesgo elevado de complicaciones metabólicas, y buena aceptación de la suplementación (95%). La mayoría de las mujeres consumió grupos de alimentos "con alto contenido de calorías, grasa y dulce" y mostraron alta ingesta del grupo "granos y cereales" y "alimentos ricos en fibra y bajos en calorías". La ingesta fue baja en calorías (1342,50 ± 474,06 kcal), ácidos grasos monoinsaturados (4,13 ± 1,78%) y fibras (17,02 ± 10,64 g), adecuada en proteínas (22,10 ± 6,94%), carbohidratos (50,74 ± 10,96%), lípidos (26,14 ± 7,17%), ácidos grasos saturados (8,69 ± 2,74%) y ácidos grasos poliinsaturados (8,93 ± 3,51%).
**Conclusiones:** las mujeres mostraron malos hábitos alimentarios, lo que refuerza la importancia del asesoramiento nutricional en el postoperatorio tardío de la cirugía bariátrica.

## INTRODUCTION

With the growing prevalence of obesity, bariatric surgery has been more and more realized worldwide[1]. In Brazil, between years 2000 and 2007, there was a sevenfold increase in the number of surgeries and in southeast the increase was fourfold, staying ranking first in the ranking among regions of country. Unified Health System (UHS) come increasing your coverage in this procedure, covering in 2003 only 0.23% of individuals with morbid obesity, covering 1.29% in 2006[2].

Individuals submitted the bariatric surgery, besides reaching high weight loss at short term[3,4], they incline to show improvement in the profile lipid, with decrease of triglyceridemic, total cholesterol, LDL-cholesterol and increase HDL-cholesterol, above improvement in fasting glucose[3], insulin, systolic and diastolic pressure, C-reactive protein (CRP) and decrease of mortality[4].

Though benefit, individuals submitted the bariatric surgery of type malabsorptive or mixed, as the Roux-en-Y gastric (RYGBP), usually show consumption of lean mass, by deficient protein- caloric intake and lack of physical activity[5]. So, as a negative point, some patients can recuperate weight at long term of period postoperative[6]. Moreover, this intervention also can cause some nutritional deficiencies[3] due decrease at the absorption with consequent micronutrients deficiency as vitamin $B_{12}$, A[7], D, E, K, iron[8] and calcium[9]. Moreover, these deficiencies can be aggravated by low adherence to use of multivitamins and minerals supplements[10].

Moizé *et al.*[11] suggested a nutritional pyramid with suggestion of dietary intake daily for individuals in the postoperative bariatric surgery, since there are no concrete recommendations with relation at the nutritional comportment for these population and they have more tendency for nutritional deficiencies. The creation of the pyramid also is important to help at the success of surgery that consists of excess weight loss of approximately 50% and maintenance at long term[12]. Pyramid is an instrument of easy understanding that individuals post bariatric surgery could to understand how must to be their alimentation and the importance to utilization nutritional supplementations, maintenance of an alimentation balanced and physical activity[11].

The aim this study was evaluates the adequacy dietetic of patients in the late postoperative bariatric surgery at a university hospital in Rio de Janeiro.

## METHODS

A cross study was developed, where forty adult women were recruited, that they were assisted in the program of bariatric surgery at the University Hospital Clementino Fraga Filho (UHCFF) of University Federal of the Rio de Janeiro (UFRJ), that they were submitted RYGBP. Women pregnant, smoking, alcoholics, that used drugs, had other disease chronic non-transmissible (diabetes mellitus, hypertension, dyslipidemic, heart disease, kidney disease, liver disease, inflammatory bowel disease, cancer).

The study was accepted for Committee on Ethics in Research of the UHCFF of UFRJ, with the protocol 121/10. The subjects signed the free and informed consent authorizing the data collection for the study.

The dietetic evaluation was made through a semi quantitative food frequency questionnaire. The analysis of chemical composition of usual diet (energy, macronutrients and fiber) of the subjects happened using the program DietPro version 5i, using as base the Brazilian Table of Chemical Composition of Foods.

So, the servings of the foods/preparation intake for subjects was realized to check if they were according what is proposed for nutritional pyramid for patients post bariatric surgery. The nutrients evaluated were compared with the dietary requirement intake (DRI) for health population. To calculate energy was used the predictive formula for estimating total energy expenditure for maintenance of weight and subtracted 10% this value for weight loss [TEE = 448 - (7.95 × age [years]) + PA × (11.4 × weight [Kg] + 619 × height [m])]. As physical activity was utilized for sedentary 1.00 and for low physical activity 1.16. After, the mean of the total energy expenditure was calculated. We obtained energy of 2000 Kcal/day; 45 - 65% TEE of carbohydrate; 20 - 25 grams/day of fibers; 20 - 35% TEE of fats; ≤ 15% TEE of monounsaturated fatty acids (MUFA); de 6 - 11% TEE of polyunsaturated fatty acids (PUFA); e ≤ 10% TEE of saturated fatty acids (SFA)[13]. The recommendation 60 - 80 grams/day de proteins proposed for Aills *et al.*[14] was used.

The weight (Kg) of subjects was measured at digital scale from the brand Welmy, with capacity of 300 Kg and variation of 50 g, and using light clothing. The height was measured in centimeters (cm) with anthropometric ruler of the balance reported, with the subject barefoot, leaning against the ruler, with feet together. The weight and stature were utilized for calculated the body mass index (BMI)[15].

The waist circumference (WC) (cm) was measured with an anthropometric tape inelastic of 2.0 m length of mark Sanny. The measure was realized at the mean point between the margin of the last rib and the iliac crest. Three measures was realized and considered their mean. The standardization of the measurement of the WC is performed according to WHO[16].

The data collecting was analyzed used the Statistical Package for the Social Sciences (SPSS) version 1.6 program. The results were represented at mean and standard derivation (mean ± standard derivation) and compared with the recommendation found at the literature (energy 2000 kcal/day, carbohydrate 45 - 65% do TEE, fibers 20 - 25 grams/day, fat 20 - 35% do TEE, MUFA ≤ 15%, PUFA 6% - 11%, SFA ≤ 10%[13] e 60 - 80 grams of protein/day[14]).

## RESULTS

The age of the subjects that participated at the study was 43.1 ± 9.968 years and the mean surgery time was 3.6 ± 1.757 years. Women showed class I obesity and very high risk for metabolic complications associated due to central adiposity. These dates can be found in the Table 1.

**Table 1.** Characterization of the study population (n = 40).

| Variables | Mean ± Standard Deviation |
|---|---|
| Age (years) | 43.10 ± 9.97 |
| Actual weight (kg) | 88.89 ± 14.43 |
| Stature (m) | 1.62 ± 0.08 |
| BMI (kg/m²) | 33.85 ± 4.05 |
| Waist circunference (cm) | 98.61 ± 16.55 |
| Surgery time (years) | 3.60 ± 1.76 |

**BMI** *(body mass index)*

Sixty-five percent of women (n = 26) do not practiced any type of physical activity, and from among the physical activity realized to subjects (35% women, n = 14) are included walk, exercises made inside the water, workout, running, go cycling and dancing with frequency ranging 3 - 5 times a week and duration of exercises of 30 minutes until 1 hour and 30 minutes. Only two women (5%) did not made to use of nutritional supplement and those that used supplements, 22.5% only used centrum®, 42.5% used centrum® united with B complex and other 30% used other type of multivitamin that is not centrum® (clusirol® and lavitam®) or combination of centrum® with other specific supplement generally calcium, acid folic, vitamin D and/or iron.

The dietary intake of women is showed in the Table 2. The diet of subjects was low-calorie, adequate in carbohydrate, protein, fat, PUFA, SFA and low MUFA and fiber. With respect to protein for kilogram of body weight was found 0.81 g/Kg of weight/day.

**Table 2.** Usual dietary intake of the study population (n = 40).

| Variables | Mean ± Standard Deviation |
|---|---|
| Energy (kcal) | 1342.50 ± 474.06 |
| Carbohydrate (%) | 50.74 ± 10.96 |
| Protein (g) | 71.69 ± 28.62 |
| Protein (%) | 22.10 ± 6.94 |
| Fat (%) | 26.14 ± 7.17 |
| MUFA (%) | 8.69 ± 2.74 |
| PUFA (%) | 4.13 ± 1.78 |
| SFA (%) | 8.93 ± 3.51 |
| Fiber (g) | 17.02 ± 10.64 |

**MUFA** *(monounsaturated fatty acids);* **PUFA** *(polyunsaturated fatty acids);* **SFA** *(saturated fatty acids)*

According to the nutritional pyramid proposed for population this study, the writer made a division in food groups, which the groups elaborated for him are: "high protein, low fat foods", "high fiber, low calorie foods", "grains and cereals", and "high calorie foods, fat and sweets are energy dense foods". The consumption of foods group "high protein, low fat foods" was adequate, but the groups "high fiber, low calorie foods" and "grains and cereals" showed upper of recommendation. In the foods group "high calorie foods, fats and sweets are energy dense foods", in which the recommendation is zero servings a day, 97.5% (n = 39) of the women consumed some portion these foods a day (Table 3).

## DISCUSSION

In the present study was checked that the subjects showed class I obesity and high central adiposity. The acceptance to use of the supplements was great (95%). Higher percentage of patients ingested foods "high calorie foods, fat and sweets are energy dense foods", despite the number of servings of "grains and cereals" and "high fibers, low calorie foods" are above of recommendation.

According to the pyramid proposed for Moizé *et al.*[11], the basis of this must include physical activity and vitamin and mineral supplement, especially calcium, vitamin D, iron, complex B and vitamin $B_{12}$. In this study not all women were using micronutrients supplements cited earlier isolation. According to Brolin *et al.*[10], almost 7.7% of patients abandoned the usage of multivitamins and minerals after 2 years bariatric surgery and only 33% patient's use supplement at least five times a week.

The usage of vitamin and mineral supplement in the postoperative bariatric surgery is essential to avoid the deficiency these micronutrients, being necessary the specific supplementation some vitamins and minerals[8].

Studies have showed that bariatric surgery causes some nutritional deficiencies especially vitamins of complex B, vitamin D, calcium, iron and protein[17]. The iron deficiency must decreased absorption place for surgery and low secretion of hydrochloric acid, which prevents the reduction of the $Fe^{3+}$ to $Fe^{2+}$ and consequently prevents absorption of iron[14]. With reduction in the production of hydrochloric acid there will also be reduction of vitamin $B_{12}$ absorption, because the conversion of pepsinogen in pepsin, which helps in the liberation of this vitamin in the foods protein, will not happen. Moreover, parietal cells of the stomach produce intrinsic factor and the reduction these also can interfere in the absorption of the vitamin $B_{12}$[18]. Other components can result to reduction of the food intake with anorexia, vomits, diarrhea, food intolerance, alcoholism or reduced absorptive capacity adaptive individual[14].

In the evaluation quantitative of alimentary intake checked that the subjects showed diet low calorie, adequate in carbohydrate, protein, lipid, PUFA and SFA, and low-MUFA and fibers. In the literature has not recommendation of energy and macronutrients for population post bariatric excepting protein recommendation[11].

The fibers and integrals foods are associated with the prevention of the weight gain after surgery, unlike foods that contain high fat, sugar and calorie that are associated with low weight loss[19]. According Faria *et al.*[20] patients post-bariatric that realized high intake of lipids and carbohydrates

**Table 3.** Usual intake of food groups of the study population (n = 40).

| Variáveis | Mean ± Standard Deviation | Recommendation |
|---|---|---|
| High protein and low fat | 5.61 ± 2.28 | 4 – 6 portions |
| High fiber and low calorie | 4.93 ± 2.76 | 2 – 3 portions |
| Grains and cereals | 3.40 ± 1.83 | 2 portions |
| High calories, fat and sweets | 1.66 ± 1.57 | 0 portions |

showed low weight loss. There is a link between weight loss of patients post-bariatric with energy intake, and its restriction is main generator of weight loss, because they provide a negative energy balance[21]. The increased intake of sugars causes an increase weight for high energy intake, because usually high sweets foods have energy-dense[22]. The fat has decreased capacity of satiety which makes that increase the individual intake more energy at the next meal[23] and, moreover, the lipid is stored more efficiently in the form the fat than the carbohydrate[24]. On the other hand the fibers require more mastication, secretion of gastric juice and increase satiety of the individual, and reducing food intake at the next meal[25].

The reduction of calorie intake is objective of dietetic treatment at the obesity and postoperative of the bariatric surgery[26] and it is associated with weigh loss at the postoperative at long time[20]. Study has showed a calorie intake around 1500 kcal at individuals with 3 to 4 years bariatric surgery. In this study, the average calorie intake was 1342.5 kcal daily, being a value similar to found in the literature. Studies that evaluate calorie intake the individuals post-bariatric surgery has reported that the low-caloric intake also can be derived from the underreporting of foods intake, because patients intake above what they should or because they do not know domestic measures[27].

Studies have showed intake that of macronutrients of patients post-bariatric surgery is around 45% carbohydrate, 20% protein and 35% fats[21,27]. In the present study only the protein intake was similar to the studies reported where fat intake was lower and the carbohydrates higher to found in the literature. Studies report that only caloric intake influence at the weight loss in the postoperative, independent of the proportion of carbohydrate and fat in the diet of the individual[22].

The protein food intolerance for patients in the postoperative of the bariatric surgery has been reported some studies, that can happen at short and long term[28]. Reach the daily requirements of protein help to inducing satiety, which stimulate weigh loss and improves body composition, helping at the maintenance of lean mass[29]. Intake adequate protein, found in the present study may be must to continuous nutritional education that subjects receive in the pre and postoperative in the hospital where the study was realized.

Almost all of the patients of the present study ingested high calories, fat and sweet foods. According Faria *et al.*[20] intake this food is not desirable to weight loss. The calorie foods limit the weight loss and patients who can prevent consumption of these; they have maintenance weight satisfactory long-term weight postoperative[30].

The fibers intake was reduced quantitatively, although the numbers of servings have been consumed more than the recommendation by the pyramid. The reduced intake of fibers may be resulted to the restriction in the intake of vegetables and fruits after surgery and therefore be maintained for a long term[31] and also by restricting the gastric capacity resulting surgery, which limit food intake indigestible[3].

The present study showed some limitations including the instrument used to evaluate the dietetic intake of the voluntaries (semi-quantitative questionnaire), whose may under, or overestimate this intake, especially in obese patients. However this little fault is considered in the calculation of nutrients intake, which minimize errors associated with the method. The study only was conducted with women that achieved a specific type of bariatric surgery, the RYGBP, which limited the applicability of the results obtained, however ensures the homogeneity this population.

In women at postoperative of the bariatric surgery the intake caloric, fibers and MUFA was reduced. There was adequacy of fat, carbohydrate, protein, PUFA and SFA intake. The qualitative analyzed show intake of foods high in "calories, fats and sweets", although increase in the number of servings of foods/preparations "high-fibers and low-calories" and "grains and cereals". Although nutritional accompaniment and educative actions, it is observed that the usual alimentary of this population show quantitative and qualitative inadequacies which reinforce the effective participation of nutritionist professional at the bariatric surgery team.

## COMPETING INTERESTS

All authors state that there are no conflicts of interest in preparing the manuscript.

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