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Trabajo Original

Obesidad y síndrome metabólico

Comparison of the dietary intake amongst women in the late postoperative period after Roux-en-Y gastric bypass with the bariatric food pyramid

Comparación de la ingesta dietética entre las mujeres en el postoperatorio tardío después del bypass *gástrico en Y de Roux con la pirámide nutricional bariátrica*

Michelle T. F. Reichmann[1], Solano Todeschini[2], Nicholas Setter[2], Regina Maria Vilela[1] and Rosana Radominski[1]

[1]Programa de Pós Graduação em Alimentação e Nutrição. Universidade Federal do Paraná (UFPR). Curitiba, Brazil. [2]Medicina da Universidade Federal do Paraná (UFPR). Curitiba, Brazil

Abstract

Introduction: the Roux-en-Y gastric bypass (RYGB) is considered to be an efficient treatment of obesity. There is an improvement in the dietary intake in the immediate postoperative period, but after the first year there is a tendency to return to the old pre-surgery habits. The objective of the present study was to compare the dietary intake of women in the late postoperative period after RYGB with the recommendations of the specific bariatric food pyramid.

Methodology: the whole population of patients submitted to RYGB being accompanied by two out-patients departments of the Complexo Hospital de Clínicas of Universidade Federal do Paraná in the period from March to September 2017 were considered, selecting only those who conformed to the inclusion criteria. The analyses carried out were: the hospital records, anthropometric evaluation, basal metabolic rate by indirect calorimetry, food consumption and questionnaires concerning physical activity, food intolerance and the dumping syndrome. The food consumption was separated into food groups in order to compare with the specific pyramid. Descriptive analyses were used to characterize the sample.

Results: it can be seen that the percent of macronutrients in relation to the total energy value (TEV) was within the values established by the recommended dietary allowances (RDA), although with respect to fiber, 68% of the participants showed a consumption below the adequate intake (AI). Inadequacy was observed for practically all the components when comparing the number of portions per food group of the bariatric pyramid, with the exception of the protein group.

Conclusion: after RYGB, the dietary consumption was compromised in quantity and quality. In addition, in the late postoperative period, women tended to choose high calorie dense foods poor in fiber, a fact that is aggravated by the presence of food intolerances.

Key words:

Gastric bypass. Food standards. Dietary intake. Bariatric food pyramid.

Resumen

Introducción: el *bypass* gástrico en Y de Roux (BGYR) es considerado un tratamiento eficaz de la obesidad. Normalmente, se percibe una mejoría en la ingesta dietética en el postoperatorio inmediato, pero después del primer año hay una tendencia a volver a los viejos hábitos preoperatorios. El objetivo del presente estudio fue comparar la ingesta dietética de las mujeres en el postoperatorio tardío después del BGYR con las recomendaciones de la pirámide nutricional bariátrica.

Material y métodos: se consideró a toda la población de pacientes sometidos a BGYR, además de dos ambulatorios del Complexo Hospital de Clínicas de la Universidade Federal de Paraná en el periodo de marzo a septiembre de 2017, seleccionando solo a aquellos que cumplían con los criterios de inclusión. Los análisis realizados fueron: registros hospitalarios, evaluación antropométrica, tasa metabólica basal por calorimetría indirecta, consumo de alimentos y cuestionarios sobre actividad física, intolerancia alimentaria y síndrome de *dumping*. El consumo de alimentos se dividió en grupos de alimentos para compararlos con la pirámide específica. Se utilizaron análisis descriptivos para caracterizar la muestra.

Resultados: podemos observar que el porcentaje de macronutrientes en relación con el valor energético total (VET) estuvo dentro de los valores recomendados por las ingestas diarias recomendadas (IDR), aunque con respecto a la fibra, el 68% de los participantes mostró un consumo inferior a la ingesta adecuada (AI, por sus siglas en inglés). Se observó una insuficiencia en prácticamente todos los componentes al comparar el número de porciones por grupo de alimentos de la pirámide bariátrica, con la excepción del grupo de proteínas.

Conclusión: después del BGYR, el consumo dietético se vio comprometido en cantidad y calidad. Además, en el postoperatorio tardío, las mujeres tendían a elegir alimentos ricos en calorías y pobres en fibra, un hecho que se agrava por la presencia de intolerancias alimentarias.

Palabras clave:

Bypass gástrico. Patrón alimentario. Consumo de alimentos. Pirámide nutricional bariátrica.

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Correspondence:

Michelle T. Frota Reichmann. Programa de Pós Graduação em Alimentação e Nutrição. Universidade Federal do Paraná (UFPR). Av. Lothário Meissner, 632. 80210-170 Jardim Botânico, Curitiba (PR). Brazil
e-mail: mitfreichmann@gmail.com

INTRODUCTION

The Roux-en-Y gastric bypass (RYGB) is considered to be an efficient treatment of obesity and is associated with a decrease in mortality in obese patients (1-3). However, the non-maintenance of the weight loss on a long-term basis, a fact commonly observed in post-bariatric patients, can have a severe impact on the health of these individuals, becoming an important complication (4-6).

In Brazil, the dietary intake of overweight and obese individuals is rich in saturated fat and industrialized products, containing a high calorie density but poor in nutrients (7). Although authors have indicated an improvement in food intake in the first six post-operative months (8-10), after the first year there is a tendency to return to pre-surgery food habits (10,11).

Despite the significant changes in food intake after bariatric surgery, few studies evaluate food intake in the late postoperative period. In addition, studies comparing the food intake of this population with the bariatric pyramid are scarce. Thus, the objective of this study was to compare the food intake of women in the late postoperative period after RYGB with the recommendations of the specific pyramid.

METHODS

The present study was approved by the Ethics in Research Committee of the Complexo Hospital de Clínicas of Universidade Federal do Paraná (CHC-UFPR) under report nº CAAE: 62120316.4.0000.0096.

All patients submitted to RYGB and accompanied by multidisciplinary out-patients departments of CHC-UFPR in the period from March to September 2017 were included in the initial sample (n = 340). Only those patients who conformed with the following inclusion criteria were selected: adult women submitted to RYGB in the CHC-UFPR in the period from 2005 to 2015, non-pregnant and having no metallic prostheses that could compromise any evaluation. The participants were invited to participate by telephone or approached on the day of their routine consultations. A total of 127 women were selected but 70 did not want to take part for personal or financial reasons, resulting in 57 participants. The analyses carried out were: medical record (demographic data, preoperative weight and postoperative nutritional accompaniment), anthropometric evaluation (weight and height) (12), basal metabolic rate by indirect calorimetry using the VMAX 29 Encore apparatus, and in the Metabolic Unit of CHC-UFPR, food intake and questionnaires concerning the level of physical activity (13), food intolerances (where the foods most cited in the literature were presented to the participants) (14) and the dumping syndrome according to the Sigestad score (15,16).

To analyze food ingestion, a 24-hour reminder was applied first to train the participants, followed by the use of a food report to be filled in for three days, including two weekdays and one weekend day. After returning the report, the not sufficiently clear data were duly identified together with the participant and visualization of food portions from the Unicamp photographic manual 2014. The reports were standardized according to the *Tabela de Composição Nutricional dos Alimentos Consumidos no Brasil* (TACO) of the Brazilian Institute of Geography and Statistics (17) and, if necessary, according to the *Tabela para Avaliação do Consumo Alimentar em Medidas Caseiras* (18), the *Manual de Críticas de Inquéritos Alimentares* (19) or food labels. The data were then typed into the Brasil Nutri® software, and the spreadsheet generated related to TACO using the IBM® SPSS® Statistics 20 software. At the end of this process, the data generated were: macronutrients and fiber (grams per kilo of weight and percentages), energy value and food groups.

When separated into food groups, a comparison was made with the food pyramid adapted for postoperative bariatric surgery (20), for which the number of portions has to be calculated. According to the bariatric pyramid, the levels are divided as follows: the base is composed of recommendations for physical activity, adequate hydration and vitamin and mineral supplements. Following this, the groups are divided into: proteins, with a recommended ingestion of four to six portions per day, each portion being equivalent to approximately 30-80 g or 115-140 ml; vegetables, where the recommendation is for two to three portions per day, each portion being equivalent to 30-85 g; fruits, where the recommendation is for two to three portions per day, with each portion equivalent to 70-140 g; cereals and tubers, where the recommendation is for two to three portions per day, with each portion equivalent to 30-90 g; and finally fats and sweetmeats, where the recommendation is to avoid them, each portion being equivalent to 5 g and 15 g, respectively.

The sample characterization was carried out as from the descriptive statistical analysis (mean, standard deviation, median and frequencies) using the IBM® SPSS® Statistics 20 software.

RESULTS

The final sample was composed of 57 participants with a mean age of 47. Although the mean % EWL found was 68%, the majority of the participants were still obese, with a mean percent weight regain of 19% (Table I).

With respect to physical activity, according to the criteria of the World Health Organization (WHO), the majority of the participants were sedentary. According to the other questionnaires applied, 63% of the participants were classified as dumpers according to the Sigestad score, 75.5% showed intolerance to more than one food item and 50% reported not having followed the nutritional accompaniment in the postoperative period.

An evaluation of dietary intake showed that the percent of macronutrients in relation to the total energy value (TEV) was within the values recommended by the acceptable macronutrient distribution ranges (AMDR) (21), although with respect to fiber, 68% of the participants showed consumption below the adequate intake (AI) (Table II).

A comparison of the number of portions per food group of the participants' dietary intakes with the bariatric pyramid showed inadequacy for practically all the components, with the exception of the protein group (Table III).

Table I. Sample characterization

	Participants (n = 57)
Age (years)	47 (30-59)
Pre-weight (kg)	115 (85-180)
Minimum weight reached (kg)	70 (± 14.5)
Current weight (kg)	80 (46.5-153)
Pre-BMI (kg/m^2)	45 (± 6.54)
Current BMI (kg/m^2)	31 (± 6.84)
% EWL	68% (± 9)
% Weight regain	19% (0-71)

% EWL: excess weight loss percent; BMI: body mass index. Descriptive analysis of the variables expressed as mean ± standard deviation or median and minimum and maximum values.

Table II. Description of the energy values, macronutrients, fiber and references

	Participants (n = 57)*
Energy	
kcal	1,287 (217-3,046)
kcal/kg weight	16.8 (2.4-48.6)
Protein	
g/kg weight	0.78 (0.15-1.5)
% TEV	18.7 (10-27.4)
AMDR (% TEV)	10-35%
Carbohydrate	
g/kg weight	2 (0.26-5.43)
% TEV	49.9 (26-68.5)
AMDR (% TEV)	45-65%
Lipid	
g/kg weight	0.57 (0.09-2.35)
% TEV	31.5 (19.6-49.9)
AMDR (% TEV)	20-35%
Fiber	
g/kg weight	0.27 (0.07-0.53)
g/day	21 (6.7-33.7)
Below 25 g/day (RDA/AI)	39 (68%)
Above 25 g/day (RDA/AI)	18 (32%)

*% TEV: total energy value percent; AMDR: acceptable macronutrient distribution ranges; RDA: recommended dietary allowances; AI: adequate intake. *Descriptive analysis of the variables expressed as the median, minimum and maximum values and frequency.*

DISCUSSION

Although a mean value for the % EWL > 50 was found, it can be seen that the majority of the participants were still obese, which can be explained by the sedentarism of the individuals combined with a high ingestion of carbohydrates, sweetmeats and fats; this can be seen by comparing with the bariatric pyramid. Good food choices combined with an active life appear to contribute to maintenance of the weight loss, thus avoiding weight regain (9,22,23).

Table III. A comparison of the consumption of food group portions with the bariatric pyramid (BP)

Food group (recommendation of portions of the BP)	Number of portions (minimum-maximum)
Vegetables (2-3)	1 (0-8)
Fruits (2-3)	1 (0-4)
Cereals and tubers (2-3)	4 (0-8)
Proteins (4-6)	5 (1-9)
Sweetmeats (0)	2 (0-17)
Fats (0)	2 (0- 24)

Source: the authors. The results are expressed as the quantity of portions referring to the food groups and the maximum and minimum numbers of portions.

In the present study, the percent of macronutrients was shown to be adequate with respect to TEV and when compared with the recommendations, a fact also found by other authors (24). However, this does not signify that the quality of these macronutrients was ideal, since inadequacy was observed with respect to the consumption of fibers by the majority of the participants, for example. This fact can be explained by the slow gastric emptying of this food group.

The reduction in gastric capacity is related to the reduction in volume of the food intake in the first months after surgery (25), although recent studies have indicated a relationship between the quantity and quality of the food and the speed of gastric emptying (26), suggesting that the quicker the gastric emptying, the smaller the possibility of food intolerances and possible complications, for example.

In the present study it can be seen that most of the participants presented food intolerances, mostly to more than one food. Intolerances are common in post-bariatric patients (9,27,28) and, in addition to the speed of gastric emptying cited above, the lack of nutritional accompaniment in the postoperative period could be related to a worsening of this situation. Some authors have indicated the importance of nutritional accompaniment in relation to the loss of weight and maintenance of the weight loss, since correct nutritional orientation and a good choice of diet decrease intolerances and discomfort and avoid the return to old habits, contributing directly to the success of the treatment (9,24,29-31).

In addition, the high prevalence of the dumping syndrome found in the public in the present study, which was reinforced by the literature (32-34), suggests that this later complication is a col-

lateral effect of the surgical technique, and could be related to the secretion of incretins and an exaggerated induction of the insulinemic response, consequently causing a fall in blood glucose to hypoglycemic levels. It is possible that the exaggerated consumption of carbohydrates by the population in the present study could have contributed to this clinical condition.

The type of study could be indicated as a limitation, since an evaluation as from the preoperative period up to the late postoperative period would be of interest, in order to compare the results. In addition, since the method used to evaluate food consumption was subjective, it might not have been very precise, even though tools validated by the literature were applied (35,36).

The bariatric pyramid was created with the objective of creating healthier lifestyles and food habits, considering the reduced gastric capacity and specific nutritional requirements (8,10,20). This pyramid is specific for postoperative bariatric surgery and is a more accurate tool to evaluate the food intake of this public. Considering this specific pyramid, a consumption of fruits and vegetables below the recommended values and consumption above the ideal value for carbohydrates, sweetmeats and fats can be observed, which was also reported in other studies (9,10,11,37). Although some authors reported a decrease in the consumption of high calorie-dense foods in the first postoperative months (8), their consumption in the late postoperative period contributed to the non-maintenance of the weight loss (9,38).

CONCLUSION

After RYGB, food consumption was compromised in both quantity and quality. Added to this, the women tended to choose high calorie dense foods, poor in fiber, in the late postoperative period, a fact aggravated by the presence of food intolerances and the lack of continued nutritional accompaniment, which are important variables for a good long-term result for the surgery. Further studies are required to evaluate the food consumption as from the preoperative period up to the late postoperative period in order to better understand the evolution of the food habits of these patients.

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