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Food consumption in patients referred for bariatric surgery with and without binge eating disorder☆

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ABSTRACT

Introduction: The prevalence of Binge Eating Disorder (BED) is high in obese patients referred to bariatric surgery. Although the total energy intake is increased, the risk of nutritional deficiencies in these patients is unknown. This study proposes to evaluate and compare the intakes of candidate patients for bariatric surgery with and without BED, using for this purpose the *Dietary Reference Intakes*.
Methods: 116 patients referred for bariatric surgery were submitted to nutritional, laboratory and psychological assessments.
Results: Among the patients, 46.6% had BED, of these, 25.9% had the severe form. The patients with current depression (31.9%) were more compulsive than those without depression ($p < 0.001$). The mean age was significantly higher in patients without BED (46.94 ± 12.05 vs 42.32 ± 10.60, $p = 0.030$). The only difference in anthropometric parameters individuals with and without BED was the mid-upper arm circumference ($P = 0.047$). The percentage of energy from carbohydrates was higher in patients with BED (53.78%) than without BED (48.88%) ($U = 1222$, $P = 0.018$, $r = -0.22$). The percentage from total fat (13.63% versus 12.89%, $U = 1201.0$, $P = 0.019$, $r = -0.22$) and from saturated fat (9.04% versus 8.15%, $U = 1074.0$, $P = 0.023$, $r = -0.21$), was higher in patients without BED. When adjusted for the body weight of patients, these differences were not significant.
Conclusion: Patients with BED eat more carbohydrates and have larger mid-upper arm circumference in the face of similar body weight, suggesting a higher percentage of fat mass.

1. Introduction

Nutritional deficiencies after bariatric surgery have become increasingly recognized with the growing number of procedures (ASMBS, 2009). Around 24 million Americans have severe or morbid obesity (Ogden, Carroll, Kit, & Flegal, 2013), defined as body mass index (BMI) greater than 40 kg/m^2 and associated with more than 40 other diseases and conditions including type 2 diabetes, heart disease, stroke, osteoarthritis and cancer (Kokkinos et al., 2013).

Binge Eating Disorder (BED) is characterized by a disturbance in eating behavior, leading to a psychological, social and clinical damage. The individual consumes, within 2 h, large amounts of food, has a sense of loss of control, and has at least three of the following characteristics: eats faster, eating until feeling "full", eats in large quantities, eats alone, feeling embarrassment/disgust/anger or depression after the episodes. These behaviors occur at least once a week, for three consecutive months, and there can be compensatory behaviors (American Psychiatric Association, 2013).

Individuals with BED have higher rates of relapse, anxious and depressive symptoms while dieting (Napolitano, Head, Babyak, & Blumenthal, 2001). Studies estimate a prevalence of 15 to 50% of this disorder in obese patients who seek specialized services for the treatment of obesity (Horvath, Dias de Castro, Kops, Malinoski, & Friedman, 2014). Although bariatric surgery is restrictive, those having compulsion before surgery appear to be at risk of little weight loss or rapid weight recovery after surgery. However, it

☆ This study proposes to evaluate and compare the intakes of candidate patients for bariatric surgery with and without BED, using for this purpose the *Dietary Reference Intakes*. We evaluate 116 patients referred for bariatric surgery, all of them were submitted to nutritional (anthropometry and 3-day weighted food records with digital kitchen scale and measuring cups), laboratory and psychological assessments. We found that BED patients tend to have a higher intake of carbohydrates and lower intake of fatty acids. There is any other study of association between nutritional deficiency and BED.

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remains unclear whether the frequency of nutritional deficiencies is different in these patients (Sarwer, Dilks, & West-Smith, 2011). The description of the pattern of food intake in these subjects remains controversial.

Food consumption in the preoperative period of severe obesity is a factor that should be investigated more accurately, aiming at assisting in the recovery, and helping with the maintenance of adequate nutritional status postoperatively. Thus, this study proposes to evaluate and compare the feeding of candidate patients for bariatric surgery with and without BED using the DRIs for this purpose.

2. Materials and methods

All obese patients referred to the outpatient Endocrinology Clinic of Hospital de Clínicas de Porto Alegre (HCPA) for evaluation of a potential indication of bariatric surgery (SBCBM et al., 2006), between March 2010 and November 2013 were sequentially invited to take part in the study. All subjects were informed of the nature of the study and gave written informed consent for participation. We excluded those with diseases that could affect the diagnosis or evaluation of BED, as severe, uncontrolled depression, active psychosis, mental retardation, central nervous system diseases and patients on atypical antipsychotics or corticosteroids in pharmacologic doses.

The nutritional assessment included anthropometric examination and an evaluation of food consumption. The anthropometric parameters assessed were weight (digital physician scale—Filizola, Brazil, resolution 0.1 kg), height (wall-mounted stadiometer — Sanny, Brazil), mid-upper arm circumference (MUAC), waist circumference (WC), and hip circumference (HC); all circumferences were measured using a non-stretch, fiberglass measuring tape (Wiso, Brazil). Body mass index (BMI) was calculated by dividing the weight by the height squared. All measurements were performed in accordance with Brazilian Ministry of Health's Food and Dietary Surveillance System recommendations (Fagundes et al., 2004).

Assessment of dietary intake included three random, 24-h dietary records, with foods weighed and measured using digital kitchen scales and a measuring cup (Moulin et al., 1998; Maroni, Steinman, & Mitch, 1985). The patients were instructed by a nutritionist on the handling of the domestic digital scales and measuring cups and on the correct register of all foods consumed during the 3 days. Later, these notes were revised, complementing or correcting the mistakes. From the records, the average food consumed within 3 days was calculated, thereby obtaining the average intake. Nutritional calculations were carried out with Nutribase 7.18 software (CyberSoft, USA). The basal metabolic rate (BMR) was calculated on the basis of established formulae for overweight adult men and women (DRIs, 2005). Dietary Reference Intakes were used to analyze eating adequacy.

The psychological evaluation comprised the Structured Clinical Interview for DSM-IV Dissociative Disorders (SCID) (Steinberg, 1994; Vilela, Crippa, Hallaka, Labatec, & Zuardia, 2001) and the Binge Eating Scale (BES) (Petribu et al., 2006). The instrument had been previously validated for the Brazilian population. The metabolic evaluation consisted on dosages of triglycerides (TG), total cholesterol (TC), both by colorimetric enzymatic method (Hitachi 917, Roche, Brazil), HDL-cholesterol (HDL-c) by an enzymatic homogeneous method (Hitachi 917, Roche, Brazil), LDL-cholesterol (LDL-c) by the Friedewald formula (Friedewald, Levi, & Fredrickson, 1972). Glucose was measured by an enzymatic colorimetric (oxidase) method (Hitachi 917, Roche, Brazil), glycated hemoglobin (AIC%) by high precision liquid chromatography (Tosoh 2.2 Plus Hb A1c; Tosoh Corporation, Tokio Japan) and urinary urea by colorimetric enzymatic method (Hitachi 917, Roche, Brazil). All analyses were performed at the Clinical Pathology Service of the hospital. Any comorbidity identified on laboratory testing was confirmed by review of the patients' past medical history, current medications, and medical records.

3. Theory and calculation

Statistical analyses were carried out in SPSS v.20 software (IBM, USA). Results are expressed as means and standard deviation (SD), percentages, or median and range. Student's t-test or nonparametric tests were used to compare dietary and anthropometric variables between the groups with or without BED, X^2 to compare categorical variables, ANOVA and Kruskal–Wallis to compare anthropometric and dietary variables between categories of BED. A p-value < 0.05 was considered statistically significant. The study was approved by the HCPA research ethics committee and received financial support from Fundo de Incentivo à Pesquisa e Eventos (FIPE-HCPA).

4. Results

Two-hundred and six patients were eligible for the study, but only 116 completed all the evaluations and were included. The subjects weighed 128.72 ± 26.09 kg and BMI 48.45 ± 7.9 kg/m^2. In our sample, 31.9% had depression and 24.8% were using antidepressants; even with appropriate treatment, patients with current depression were more often compulsive than those without depression (69,4% vs 30,6%, $p < 0.001$) (Table 1). The percentage of patients scoring positive for BED in the BES was 46.6%; of these, 20.7% had a moderate disorder, and 25.9%, severe. The mean age was significantly higher in patients without BED (46.94 ± 12.05 vs 42.32 ± 10.60, $p = 0.030$).

Anthropometric characteristics are described in Table 1. The only difference found between individuals with and without BED was the MUAC ($p = 0.047$); besides, compulsive subjects tended to be heavier ($p = 0.059$). There were no other significant differences in anthropometric characteristics. When we stratified the subjects by degrees of compulsion (moderate and severe) there were no differences between them (data not shown).

Table 1
Anthropometric and clinic characteristics of patients with and without BED.

	Overall (n = 116)	With BED (n = 54)	Without BED (n = 62)	p
Age (years)	44.50 ± 11.80	42.32 ± 10.60	46.94 ± 12.05	0.030*[1]
Weight (kg)	128.72 ± 26.09	131.88 ± 25.12	124.69 ± 25.63	0.130[1]
BMI (kg/m^2)	48.45 ± 7.94	49.80 ± 7.52	47.04 ± 8.06	0.059[1]
MUAC (cm)	42.79 ± 6.38	43.97 ± 7.05	41.55 ± 5.37	0.047*[1]
WC (cm)	135.88 ± 16.88	138.07 ± 15.51	133.31 ± 17.28	0.123[1]
HC (cm)	139.42 ± 15.96	141.10 ± 14.83	137.33 ± 16.27	0.196[1]
BMR (kcal/day)	2169.30 ± 308.31	2208.29 ± 288.07	2118.81 ± 309.24	0.110[1]
Gender				
F (%)	78%	48.4%	51.6%	0.458[2]
M (%)	22%	40%	60%	
DM				
Y (%)	34.7%	48.8%	51.2%	0.722[2]
N (%)	65.3%	45.3%	54.7%	
HAS				
Y (%)	71.2%	38.6%	61.4%	0.006*[2]
N (%)	28.8%	66.7%	33.3%	
Depression				
Y (%)	31.9%	69.4%	30.6%	0.001*[2]
N (%)	68.1%	35.1%	64.9%	
TG	149.13 ± 60.10	158.89 ± 77.60	110.22 ± 14.35	0.457[3]
Cholesterol	186.90 ± 35.88	184.35 ± 38.00	188.10 ± 33.95	0.583[1]
HDL	40.84 ± 9.38	39.96 ± 8.22	41.71 ± 10.45	0.406[3]
LDL	112.84 ± 30.73	113.73 ± 32.17	111.15 ± 29.60	0.660[1]
Glucose	125.24 ± 42.50	128.74 ± 44.84	122.36 ± 41.08	0.711[3]
A1c%	6.98 ± 1.90	7.20 ± 2.20	6.70 ± 1.37	0.596[3]

BED: Binge eating disorder; BMI: body mass index; MUAC: mid-upper arm circumference; WC: waist circumference; HC: hip circumference; BMR: basal metabolic rate. W: Female; M: Male; DM: Diabetes; HAS: Hypertension; Y: Yes; N: No. TG: triglyceride; HDL: HDL-cholesterol; LDL: LDL-cholesterol; A1c%: glycated hemoglobin. Data shown as means and standard deviation (SD) and percentages [1]Independent-Samples T Test; [2]Qui-square X^2; [3]Mann–Whitney U test — correction Monte Carlo. $\alpha = 0{,}05$. %.
* = $p < 0{,}05$