ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 10, pp.59682-59685, October, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

FOOD HABITS AFTER BARIATRIC SURGERY: CHANGES, EVOLUTIONS, STAYS AND RESULTS

[1]Lídia Maria Fonteles Cândido, [3]Cibele Mary Ramos Nogueira, [2]Ismael Paula de Souza, [4]Guilherme Ferreira Maciel da Silva, [5]Gildênio Estevam Freire, [7]Larice de Carvalho Vale, [6,8]Fernando César Rodrigues Brito, [6]Vanessa Duarte de Morais, [6,8]Iramaia Bruno Silva Lustosa, [5]Gilberto Santos Cerqueira, [7]Iolanda Gonçalves de Alencar Figueiredo and [5,6,*]Ana Angélica Queiroz Assunção Santos

[1]Nutritionist, Master in Nutrition and Health - UECE
[2]Nutrition Student of the University Center Estácio do Ceará. Fortaleza, CE, Brazil
[3]Nutritionist, Master in Health Surveillance by FIOCRUZ-ENSP, Brazil
[4]Medical Student at Federal University of Ceará, Fortaleza, CE, Brazil
[5]Pos-Graduation in Morphofunctional Sciences, Federal University of Ceará, Fortaleza, CE, Brazil
[6]University Professor, University Center Estácio do Ceará
[7]Nutritionist. Federal University of Piauí, Campus CSHNB, Piauí, Brazil
[8]Renorbio - Northeast Network of Biotechnology, nº 1700 - Itaperi Campus, zip code: 60740-000, Fortaleza, Ceará, Brazil

ARTICLE INFO

Article History:
Received 10th July, 2017
Received in revised form
12th August, 2017
Accepted 19th September, 2017
Published online 31st October, 2017

Key words:
Bariatric Surgery,
Obesity,
Feeding Behavior,
Medicine.

ABSTRACT

Surgery treatment is currently the most effective option for reducing and maintaining weight loss in morbidly obese patients. Changes in dietary habits should be continuous for obtaining successful treatment. This study aimed to identify and analyze changes in dietary habits developed after bariatric surgery relating them to the treatment of nutritional deficiencies and complications resulting from surgery. The study was conducted from August to October2013, with the participation of 60 invited patients assisted by the Obesity Nucleus of Ceará. A self-administered quiz was made to evaluatethe feeding behavior before and after the surgery. Statistical tests were performed using GraphPad Prism Software, considering statistical significance levelof $p<0.05$. There were prevalence of night-eaters feeding behavior (58 %), changes in chewing, considerable reduction in fluid intake in meal patterns, and the presence of complications and disabilities such as alopecia (41 %), dumping (37 %), vitamin B12 deficiency (20%), calcium and vitamin D deficiency (12%). The feeding frequency showed an increased intake of fruits and raw vegetables, wholemeal pasta, but a reduction in milk and dairy products ingestion. Several changes in eating habits have evolved after surgery, confirming the importance of proper monitoring by a nutritionist.

Citation: Lídia Maria Fonteles Cândido, Cibele Mary Ramos Nogueira *et al.* 2017. "Food habits after bariatric surgery: changes, evolutions, stays and results", *International Journal of Current Research*, 9, (10), 59682-59685.

INTRODUCTION

At the beginning of the 21st century, the World Health Organization (WHO) drew attention to the fact that there will be approximately 300 million obese adults around the globe, representing about 60% of the world's population. This pathology defined as obesity is characterized by excessive accumulation of body fat, which in the long term may result in

Corresponding author: **[5,6,*]Ana Angélica Queiroz Assunção Santos**
[5]Pos-Graduation in Morphofunctional Sciences, Federal University of Ceará, Fortaleza, CE, Brazil.
[6]University Professor, University Center Estácio do Ceará.

Obesity is characterized as a multifactorial disease, and among its causes are environmental, behavioral, cultural, genetic, physiological, and psychological factors. For these and other reasons, this pathology is difficult to interpret, identify and manage. Among the various options, the changes in eating habits influenced by the contemporary Western lifestyle, where the globalized food production, the industrial marketing, and the facilities obtained by urbanization are emphasized (Landeiro, 2011; Da Silv, 2013). Treatment involves several approaches. Dietary counseling, physical activity scheduling and use of anti-obesity drugs are the main pillars. However, when the morbid degree is reached, these forms of treatment do not have the expected effect.

Therefore, due to the need for a more effective intervention in the clinical management since it presents low morbimortality taxes and safety for reduction and maintenance of weight loss. To achieve the expected results, many changes in the patient eating habits are stimulated. For this reason, this surgical procedure becomes a method to encourage a new diet that will promote weight loss (Geraldo, 2014; Landeiro, 2011; Steyer *et al*., 2016; Burgos, 2011). It is important to note that surgical treatment maylead to various micronutrient deficiencies, among which the most common deficiencies are vitamin B12, iron, calcium, and vitamin D. Other deficiencies that can lead to serious complications include thiamine, folic acid, and fat-soluble vitamins (Milk, 2013).

The unbalanced consumption of macro and micronutrients in pre- and post-operative periods evidences potential nutritional risks. The adequate monitoring by a nutritionist is fundamental for providing a diagnosis of wrong eating habits and promoting nutritional reeducation. One of the most important aspects is information, and every patient should be thoroughly aware of the needed changes in diet and lifestyle. These changes have to last for at least six months after the surgery, because with the passage of time he will be able to choose to adhere to the proposed recommendations or not (Landeiro, 2011; Silva *et al*., 2014; Bastos *et al*., 2013). In this context, this study aimed to know and analyze the changes in the alimentary habits developed after the bariatric surgery relating them to the treatment of complications and nutritional deficiencies resulting from the surgical process.

METHDOLOGY

It is a descriptive cross-sectional study in which patients who underwent bariatric surgery were invited to participate. These patients were followed up by professionals from the Obesity Nucleus of Ceará. Data collection was performed from August to October 2013. The study was submitted and approved by the Research Ethics Committee of the University Center Estácio of Ceará. The inclusion criteria were: men or women from 18 to 60 years old, which were randomly chose among those who came to return with the nutritionist and/or gastroenterologist, who were in the periods of 2 months, 4 months, 6 months and over 1 year after surgery. Each group consisted of 15 patients, making a total of 60 patients. They agreed to participate in the study by signing the Informed Consent Form.

To collect data, a structured questionnaire was developed and divided into blocks, covering the following topics: Identification data, Data antecedent to the surgical procedure, Eating habits, Historic of comorbidities, Presence of complications and / or deficiencies, Use of supplements and medications, and Food frequency. The questions analyzed points before and after surgery, such as weight, chewing, dominant food pattern, presence of diseases and nutritional deficiencies, quantity of daily meals, and others. In addition, to analyze the changes in the food standard, there was a frequency table, which analyzed the consumption frequency of each food listed before and after the surgery. For data tabulation the Microsoft Office Excel program was used, through tables elaboration and filling. Quantitative variables were described by Average and Standard Deviation. The tabulated data were analyzed using GraphPad Prism Software, version 5.0. For the determination of Statistical Significance was considered the value of $P < 0.05$.

RESULTS

The sample consisted of 60 patients represented 68% by the female gender and 32% by the male gender. The mean age among participants was 35 years. In relation to the greatest weight already reached by the patients, a total average of 102.10 ± 29.99 kg was obtained. While the average current weight was 97.95 ± 27.65kg. The prevailing surgery technique was gastric bypass, with 95% of the patients interviewed, the other 5% were divided into adjustable gastric band and vertical gastroplasty. As for schooling, 70% had a higher education level or were attending, given that it was uniformly highlighted in the four groups studied, while 25% completed high school and 5% completed elementary school. Regarding the stage of life in which the patient detected obesity, the adult stage had the highest percentage (36.67%). In sequence, 33.33% was obtained in adolescence, 16.67% after gestation and 13.33% during childhood. About the other treatment options for weight loss, there was an equality, where the medication and the self-care regimen obtained 81.67% each, while the dietary follow-up obtained 68.33% and the physical exercise 66, 67%.

Before the surgical procedure, the night-eater (atea lot at night), with 58.33% of the patients, was the dominant eating pattern. Then, with 46.67%, the gluttons stood out (they ate large quantities per meal). Soon after, with 38.33%, the binge-eaters were found (compulsive for food at any time of the day). Then, 28.33% were obese who consumed large amounts followed by feelings of purgation, and finally 26, 67% in the pattern of the candy eaters. It is noteworthy that after the surgery only 5% stated to remain in the pattern of night-eaters, 5% as gluttons and 3.33% as candy eaters. The results of the survey about chewing can be interpreted in Figure 1. In this, the transition from rapid mastication, in the period before surgery, to normal or slow, after surgery, can be highlighted. Another important question approached the consumption of liquids during meals, before and after surgery, including in which meals there was liquid intake. These data can be analyzed in Figure 2.

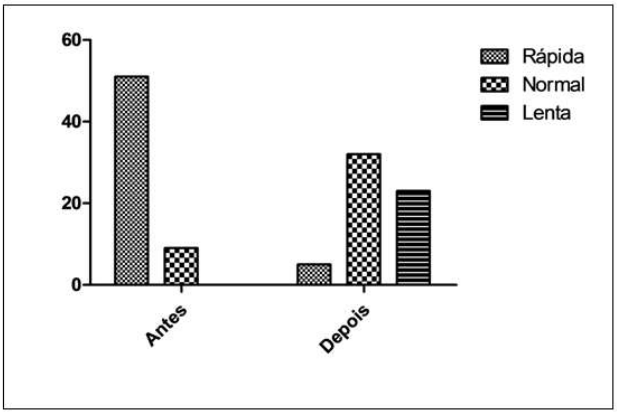

Fig.1. Representative of the chewing changes of patients undergoing bariatric surgery

The use of vitamins was standardized according to what is prescribed by the gastrologist physician: vitamin B12 and a multivitamin complex. The complications presented after the surgical procedure were alopecia (41%), dumping (37%), vomiting (27%), diarrhea (22%), constipation (15%) and anemia (6%). In relation to deficiencies, vitamin B12 deficiency (20%), calcium and vitamin D deficiency (12%) were detected, without deficiencies (62%), besides iron that was detected by anemia.

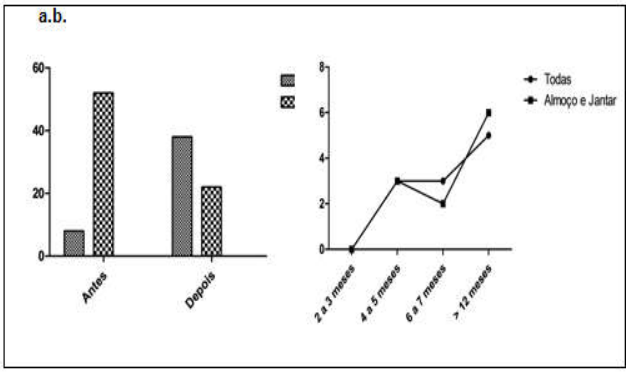

Fig. 2. Representative about the consumption of liquid during the meal. A Comparison of fluid intake before and after surgery. B Evolution of changes in fluid intake during meals in the post-operative period

	Beforesurgery	Aftersurgery	Neverpresented
Hypertension	40%	4%	56%
Heart diseases	10%	0%	90%
High Cholesterol	33%	2%	65%
Diabetes	18%	2%	80%
Sleepproblems	45%	8%	47%
Joint diseases	35%	13%	52%
Difficultyto Getpregnant	30%	8%	62%

Based on the presence of comorbidities (Table 1) associated with obesity, it was noticed the presence of hypertension (40%) before surgery, and its reduction to 4%after surgery to. Regarding food frequency (Figure 3), it can be observed that there was a change in the amount of consumption per day of the main food groups during the post-surgical period. It was observed a reduction in pasta consumption during the post-operative period up to the 5th post-operative month, and then there was an increase of its consumption, although it did not reach the levels of consumption in the pre-operative patient. However, regarding to the consumption of raw fruits and vegetables, a curve opposite to that of pasta consumption.

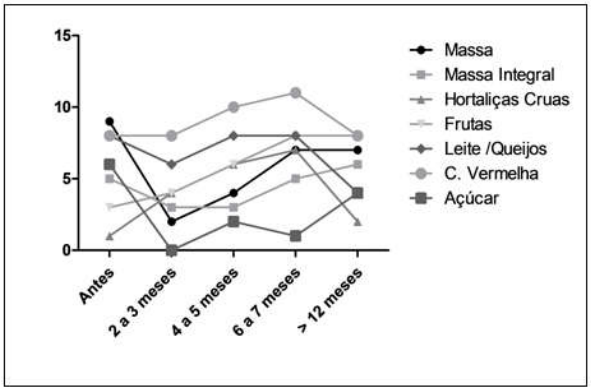

Fig. 3. Representative of the main changes in dietary intake of foodstuffs observed in the post-surgical period

DISCUSSION

In the present study, the first subject to be discussed is the reduced value between the mean of the weights (highest obtained before surgery and current). In a study conducted by Guimarães *et al*. (2006), the predictive factors for weight loss after surgery were analyzed, among them the genre, stating that in the male there was a tendency to greater weight loss, the schooling, because the higher the schooling the better the result of the surgical technique, with bypass providing the best results in weight loss. Therefore, it can be highlighted that although a large part of the sample had a higher education level and the bypass technique was performed, the mean weight loss was not expressive, it is also worth mentioning that 68% of the sample was composed by females. When analyzed about the other treatment options performed, it is understood that there was preference for drug treatment and regimens without adequate nutritional monitoring. This fact is relevant, because it proves that there is a need for adequate nutritional intervention before surgery, to aware the patients about the importance of adequate nutritional monitoring, investigation of possible deficiencies, and thus, provide the necessary nutrients for the recovery and health (Silva *et al*., 2014; Bastos, 2013).

After the post-surgery period, there was a considerable evolution in the chewing and reduction of liquid intake during meals, as shown in figures 1 and 2. Figure 2-B showed that after 6 months, the habit of drinking liquids was restricted to lunch and dinner. Chewing is emphasized because there is a complete follow-up to teach the patient how to chew properly, since the food must obtain pasty consistency before being swallowed, which guarantees a better post-surgical digestive process (Landeiro *et al*., 2011; Da Silva, 2013; Milk, 2013; Steyer *et al*., 2016; Burgos *et al*., 2011; Silva *et al*., 2011; Guimarães *et al*., 2011; Bastos *et al*., 2013; Vitolo, 2008; Santos *et al*., 2015). Another point discussed is about micronutrient deficiencies, which these patients presented with vitamin B12, calcium, vitamin D and iron, even with the use of routine supplementation after surgery. Some factors that favor nutritional deficiencies are reported, including inadequate body reserves, malabsorption due to surgical technique, decreased nutrient intake and lack of understanding of its use (Silva *et al*., 2011; Guimarães *et al*., 2011; Bastos *et al*., 2013; Vitolo, 2008; Santos *et al*., 2015). Therefore, the non-adherence to nutritional recommendations, the reduction of food intake and the surgical process effects support the prevalence of these deficiencies. About complications after surgery, the most referred were alopecia and dumping, which are involved with difficulties in controlling eating practices. Dumping syndrome may be related to ingestion of large amounts of sugars, while alopecia involves protein, essential fatty acids, andzinc deficiency (Geraldo *et al*., 2014; Landeiro *et al*., 2011; Da Silva, 2013; Milk, 2013; Steyer *et al*., 2016; Burgos *et al*., 2011; Silva *et al*., 2011; Guimarães *et al*., 2011; Bastos *et al*., 2013; Vitolo, 2008; Santos *et al*., 2015). Analyzing Figure 3 it can be noticed that sugar only had a decrease in intake during the first months of surgery, increasing its consumption from the6thpost-operativemonth. The red meat, which is the main protein sources, obtained an increase of the consumption only during the first 6 months, and soon after, its reduction. Opposite to what is observed in the literature, the presence of comorbidities was not elevated, and those who presented had a considerable improvement of the frames after the surgery. Some factors obtained after surgery such as weight loss, reduction of hyperinsulinemia and intra-abdominal pressure, and the improvement of glucose metabolism contribute directly to the improvement of these comorbidities (Vitolo, 2008). According to Vitolo (2008), man's eating habit develops from birth, and flavors experienced in the first months of life influence the food preferences years after. Therefore, it is expected that there is resistance in modifying the habitual diet of each patient. However, by looking at Figure 3, many dietary modifications can be observed. The first significant change was the increase in the consumption of whole grains with

reduction of the refined masses, which can act to benefit patients presenting constipation, high cholesterol and diabetes, due to the greater contribution of fiber (Catalani *et al*., 2003). The second and third positive developments were the expressive increase in the consumption of raw fruits and vegetables, which according to the graph evolves every post-operative period. Another modification directly linked to calcium and vitamin D deficiency, identified in 12% of the patients, was the reduction of milk and dairy products consumption. According to the graph, it can be analyzed that the consumption decreased especially for the patients who had at least 6 months of operated.

Conclusion

At the end of the study many modifications could be observed, such as improved chewing and increased intake of raw fruits and vegetables, which were positive consequences kept after surgery. While the patient should still be warned about some issues such as the importance of milk and dairy products intake during the pre- and post-operative nutritional monitoring. Surgery helps to succeed in weight loss, but nutrition is essential during the treatment of deficiencies and complications obtained, confirming the importance of monitoring by the nutritionist.

Conflict of Interests

The authors declare no conflict of interest.

REFERENCES

Bastos, ECL., Barbosa, EG, Soriano GMS, Santos, EA., Vasconcelos, SML. 2013. Determinants of ponderal regrowth in the post-operative period of bariatric surgery. ABCD, arq. Brascir. dig. 26 (11): 26-32.

Burgos, MGPA., Lima, DSC., Coelho, PBP. 2011. Nutrition in *Bariatric Surgery*. Blond 1ª Ed Rio de Janeiro.

Catalani, LA.,Kang, SEM., Dias, MCG., Maculevicius, J. 2003. Food Fibers. *Rev Bras NutrClin*. 18 (4): 178-182.

Da Motta, MJ, Aquino, CRC., Da Silva, SD. 2014. Quality of life before and after bariatric surgery. Acta Paulista de Enfermagem. 27: 157-164. Available in: http://artificial www.redalyc.org/articulo.oa?id=307031066012.

Da Silva, RF. 2013. Weight management after the second year of Roux-en-Y gastric bypass. Com. *Health Sciences*. 24 (4): 341-350.

Geraldo, MSP., Fonseca, FLA., Gouveia, MRFV. Feder, D. 2014. The use of drugs in patients who have undergone bariatric surgery. *International Journal of General Medicine.*; 7: 219-224. Doi: 10.2147 / IJGM.S55332.

Guimarães, J., Rodrigues, D., Campos, MV, Melo, M., Bastos, M., Milheiro, A., Manso, C., Castro, F., Carvalheiro, C. 2006. Predictive factors for weight loss after bariatric surgery. *Portuguese Journal of Endocrinology, Diabetes and Metabolism*. (2): 7-11.

Landeiro, FM., De Castro, QL. 2011. Obesity: neural and hormonal control of eating behavior. *Journal of medical and Biological Sciences.* 10 (3): 236-245.

Milk, JIA.,Diniz, MTC. 2013. Nutrition and metabolism in bariatric surgery. Atheneu 1st ed. Sao Paulo.

Santos, TD., Burgos, MGPA., Lemos, MCC., Cabral, PC. 2015. Clinical and nutritional aspects in obese women during the first year after gastric bypass at y-de-roux. ABCD, arq. Brascir. dig. 28 (1): 56-60.

Silva, PRB., Souza, MR, Silva, EM, Silva, SA. 2014. Nutritional status and quality of life in patients undergoing bariatric surgery. ABCD, arq. Brascir. Dig. 27 (1): 35-38.

Steyer, NH., Oliveira, MC., Gouvêa, MRF., Echer, IC., Lucena, ADF. 2016. Clinical profile, diagnoses and nursing care for patients in the post-operativeperiod of bariatric surgery. *Revista Gaúcha de Enfermagem*, 37 (1). Availablefrom: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1983-14472016000100401&lng=en

Vitolo, M.R. 2008. Nutrition: from gestation to aging. Rubio 2nd Ed., Rio de Janeiro.

****